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**THE STRUCTURE AND TRADE
COMPETITIVENESS OF THE TURKISH
AGRICULTURAL SECTOR: AN ANALYSIS OF
SELECTED AGRICULTURAL PRODUCT
GROUPS BETWEEN 2009-2020**

DOĞUKAN ÖZBİRGE

2504170035

TEZ DANIŞMANI

DR. ÖĞR. Ü. TÜRKAN TURAN

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ABSTRACT

THE STRUCTURE AND TRADE COMPETITIVENESS OF THE TURKISH AGRICULTURAL SECTOR: AN ANALYSIS OF SELECTED AGRICULTURAL PRODUCT GROUPS BETWEEN 2009-2020

DOĞUKAN ÖZBİRGE

This study aims to determine the trade competitiveness of selected Turkish agricultural product groups in the world market between 2009-2020. In this context, before discussing the trade competitiveness of Turkey's agricultural products in our study, we examined the structure of the Turkish agricultural sector, the contribution of the agricultural sector to the Turkish economy, and Turkey's agricultural policies. We used Revealed Comparative Advantage (RCA), Relative Trade Advantage (RTA), Revealed Competitiveness (RC), and Logarithmic Revealed Export Advantage (LNRXA) Indices in competitiveness calculations. In addition, we used the TBI index to examine Turkey's foreign trade balance in the analyzed product groups. The data we used in the study was the two-digit export and import data in the Harmonized Commodity Identification and Coding System of the International Trade Center.

As a result of our calculations, we concluded that three of the analyzed product groups had a comparative advantage, while nine of them had a comparative disadvantage. Turkey had a comparative advantage in product groups coded 07, 08, and 11 between 2009-2020. On the other hand, Turkey had a comparative disadvantage in product groups coded 01, 02, 03, 04, 05, 06, 09, 10, and 12 between 2009-2020. While Turkey was a net exporter in the product groups coded 02, 03, 04, 05, 06, 07, 08, and 11, it was a net importer in the product groups coded 01, 09, 10, and 12 according to an average of trade balance index results between 2009 and 2020. In addition, when we analyzed the index trends, we observed that Turkey's share in the global market increased between 2009 and 2020 in the product groups

01, 02, 03, 04, 05, 06, 09, 11, and 12. On the other hand, Turkey's share in the global market decreased between 2009 and 2020 in the product groups with codes 07, 08, and 10. According to our calculations, the product group coded 09 between 2009-2016, and product groups with codes 02, 03, 04, 05, and 06 between 2009-2020 had a comparative disadvantage according to RCA and LNRXA indices. However, these product groups had a comparative advantage over RTA and RC index calculations. We think that the import-export structure of Turkey or the interventions of the state in these product groups cause this difference between the index results.

Keywords: Trade Competitiveness, Structure of the Turkish Agricultural Sector, Agricultural Policy, Relative Trade Advantage, Revealed Competitiveness, Revealed Comparative Advantage, Logarithmic Revealed Export Advantage

ÖZ

TÜRK TARIM SEKTÖRÜNÜN YAPISI VE TİCARİ REKABET GÜCÜ: SEÇİLMİŞ TARIM ÜRÜN GRUPLARININ 2009-2020 ARASI BİR ANALİZİ

DOĞUKAN ÖZBİRGE

Bu çalışmanın amacı Türkiye’de 2009-2020 yılları arasında seçili tarım ürün gruplarının dünya pazarındaki rekabet gücünü belirlemek ve rekabet gücündeki değişimi ortaya koymaktır. Bu bağlamda rekabet gücünü ele almadan önce Türk tarım sektörünün yapısı, sektörün Türkiye ekonomisine olan katkısı ve Türkiye’nin tarım politikalarını incelenmiştir. Çalışmada rekabet gücü hesaplamalarında, Açıklanmış Karşılaştırmalı Üstünlükler (AKÜ), Nispi Ticari Avantaj (NTA), Açıklanmış Rekabet Üstünlüğü (ARÜ) ve Logaritmik Nispi İhracat Avantajı (LNİA) endeksleri kullanılmıştır. Ayrıca incelenen ürün gruplarında Türkiye'nin dış ticaret dengesini incelemek için Ticaret Dengesi (TDE) endeksinden faydalanılmıştır. Çalışmada kullanılan veriler Uluslararası Ticaret Merkezi’nin Uyumlaştırılmış Emtia Tanımlama ve Kodlama Sistemi’ndeki iki haneli ihracat ve ithalat verileridir.

Hesapladığımız endeks sonuçlarına göre ürün gruplarından üçünün karşılaştırmalı üstünlüğe sahiptir. Buna karşılık dokuz ürün grubu karşılaştırmalı üstünlüğe sahip değildir. Türkiye’nin karşılaştırmalı üstünlüğe sahip olduğu ürün grupları 07, 08 ve 11 kodlu ürün gruplarıdır. Türkiye’nin karşılaştırmalı üstünlüğe sahip olmadığı ürün grupları ise 01, 02, 03, 04, 05, 06, 09, 10 ve 12 kodlu ürün gruplarıdır. 2009 ve 2020 yılları arasındaki ticaret dengesi endeksi sonuçlarının ortalamasına göre, Türkiye 02, 03, 04, 05, 06, 07, 08 ve 11 kodlu ürün gruplarında net ihracatçı iken 01, 09, 10 ve 12 kodlu ürün gruplarında net ithalatçı oldu. Ayrıca endeks trendlerini incelediğimizde 01, 02, 03, 04, 05, 06, 09, 11 ve 12 kodlu ürün gruplarında 2009-2020 yılları arasında Türkiye'nin küresel pazardaki payının arttığını gözlemledik. Öte yandan, 2009-2020 yılları arasında 07, 08 ve 10 kodlu ürün gruplarında Türkiye'nin küresel pazardaki payı azalmıştır. Yapılan analizler

sonucunda 2009-2020 yılları arasında 02, 03, 04, 05, 06 kodlu ürün gruplarının ve 2009-2016 yılları arasında 09 kodlu ürün grubunun, AKÜ ve LNİA endekslerine göre karşılaştırmalı üstünlüğe sahip olmadığı, fakat NTA ve ARÜ endekslerine göre karşılaştırmalı üstünlüğe sahip olduğunu gözlemlenmiştir. Bu farklılığın sonucunun ülkenin ithalat-ihracat yapısından ya da devletin ürün gruplarına bulunduğu yoğun müdahalelerden kaynaklandığını düşünülmektedir.

Anahtar Kelimeler: Ticari Rekabet Gücü, Türk Tarım Sektörünün Yapısı, Tarım Politikası, Açıklanmış Karşılaştırmalı Üstünlükler, Nispi Ticari Avantaj, Açıklanmış Rekabet Üstünlüğü, Logaritmik Nispi İhracat Avantajı

PREFACE

In general, competitiveness at the macro level can be defined as the ability of a country to produce goods and services that can meet the needs of international markets while increasing the real income of its citizens under free and fair market conditions. In this context, studies aiming to calculate the competitiveness of the products exported by the countries are especially beneficial in determining the policies to be implemented by the states in the product or product groups in the future.

In recent years, problems that closely concern the world, such as climate change, global warming, and global epidemic, have adversely affected all economic activities. Like other countries, Turkey has directly been affected by these unfavorable developments in recent years. Especially the drought experienced in recent years had a decreasing effect on the level of agricultural production. In addition, as the negative conditions of the global epidemic that started in 2019 began to affect Turkey, the problems of the agricultural sector that were not mentioned as much as necessary started to become the main topic of conversations in the country. Besides, the fact that Turkey is an importer of some agricultural raw materials as well as agricultural inputs such as diesel, fertilizer, seeds, pesticides, and fodders aggravates the impact of the crisis. The study aims to analyze the trade competitiveness of selected agricultural product groups and the change in competitiveness between 2009-2020 in Turkey. In this context, before discussing the trade competitiveness of Turkey's agricultural products in our study, we will examine the structure of the Turkish agricultural sector, the contribution of the agricultural sector to the Turkish economy, and Turkey's agricultural policies.

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LIST OF ABBREVIATIONS

TURKSTAT	: Turkish Statistical Institute
GDP	: Gross Domestic Product
FAO	: Food and Agriculture Organization
TL	: Turkish Lira
OECD	: The Organisation for Economic Co-operation and Development
USD	: United States Dollar
ARIP	: Agricultural Reform Implementation Project
WB	: World Bank
IMF	: International Monetary Fund
RCA	: Revealed Comparative Advantage
RSCA	: Revealed Symmetric Comparative Advantage
RTA	: Relative Trade Advantage
RC	: Revealed Competitiveness
TBI	: Trade Balance Index
LNRXA	: Logarithmic Revealed Export Advantage
IPRAD	: Instrument for Pre-Accession Assistance Rural Development

INTRODUCTION

Agricultural activities are as old as human history. Since agricultural activities were the first economic activities, they formed a large part of the country's economy until the industrialization period and became the cornerstone of economic development. The agricultural sector has strategic importance in the national economy as it meets the food needs of the country's population, provides raw materials for the industrial sector, creates demand for industrial products, and contributes to national income and foreign trade. This strategic importance is mainly due to the food needs of the country's population. In world history, the strategic advantage of food security is especially evident in times of war. In the historical process, although the share of the agricultural sector in the country's economy began to decrease gradually in the countries that started to industrialize, the importance given to agriculture by these countries was still valid.

Turkey, with its geographical location, climatic conditions, biological diversity, trade opportunities, and agricultural production culture from the past, is among the countries with a very high agricultural potential. In the founding years of the Republic of Turkey, the agricultural sector, which constitutes a large part of the national income, provided economic development thanks to the resources it provided to other sectors and its contribution to foreign trade. In the historical process, as in all other countries, the share of the agricultural sector in the economy has decreased over time as well as in Turkey. After 1973, the share of agriculture in national income began to lag behind the industry.

The most important feature of the agricultural sector that distinguishes it from other sectors is that it is dependent on nature and consists of a biological process. The fact that agricultural production is dependent on nature, that is, the limited influence of people on production factors such as soil and climate leads to uncertainty in the yield and amount of production. This situation in the agricultural sector and its strategic importance necessitate government interventions in the sector. With these interventions, the state aims to develop agricultural production in accordance with domestic and foreign demand, to protect and develop natural and

biological resources, to increase productivity, to strengthen food security and safety, to develop producer organizations, to strengthen agricultural markets, and to increase the level of welfare in the agricultural sector by providing rural development.

In the 21st century, the agricultural sector is undergoing a transformation all over the world. The rapidly industrializing world countries in the 20th century have faced global problems such as global warming and climate crisis brought about by this rapid industrialization in the 21st century. Food crises, which were accompanied by the change in climate movements and the increase in food prices, significantly affected the agricultural sector and economies. In addition to these negative developments in the 21st century, the epidemic that started in China in 2019 spread all over the world in a short time period and started to have a negative effect on economic activities around the world. Due to this global epidemic today, countries have had to stop both human and commercial goods mobility. This situation makes it difficult for people to reach the essential goods necessary for their survival. Foreign-dependent, import-based economies are more affected by this process, especially for basic necessities. The deterioration in the supply-demand balance of foodstuffs due to disruptions in the supply chain causes prices to increase in the short term. As a result, the issue of self-sufficiency in agricultural production has started to come to the fore again.

Turkey has been directly affected by these undesirable effects in recent years. Especially the drought, natural disasters, and global epidemic in the country had an unfavorable effect on agricultural production. In addition, it has been observed that agricultural raw materials and food products have started to be imported as well as diesel, fertilizer, pesticides, seeds, feed and other agricultural inputs. Today, Turkey has lost its status as a self-sufficient country in agriculture, especially in cereals and dry pulses. In addition to the drought and global epidemic in recent years, increasing agricultural input prices and agricultural raw material imports to meet domestic demand reduce the incomes of domestic producers. All these developments create a vicious circle that causes a decrease in agricultural production while increasing domestic prices.

The concept of competitiveness has occupied the minds of economists for more than two centuries, starting with Adam Smith's *The Wealth of Nations*. Competitiveness, which does not have a commonly accepted definition, focuses more on the measurement method in the literature. In general, we can define competitiveness at the macro level as the ability of a country to produce goods and services that can meet the needs of international markets while increasing the real income of its citizens under free and fair market conditions. Similar to the complexities in definition, there are different views on the measurement of competitiveness. The measurement methods of competitiveness vary at the mega (global), macro (nations, regions), meso (economic sectors and industries), and micro (firm) levels. It is also substantial to determine whether the measurement of competitiveness represents the source or outcome of competitiveness when evaluating this term. In this context, low price, low cost, and high productivity represent the reasons for a firm's strong competitiveness, while indicators such as market share, RCA index, and trade balance represent the effects of international competitiveness.

Studies aiming to measure competitiveness helps to determine the policies that countries will implement in the future by analyzing products or product groups. In this context, the studies aiming to calculate trade competitiveness were first added to the literature by Liesner in 1958. Later on, this approach was redeveloped by Balassa in 1965. In preceding years, Vollrath developed the RTA and RC indices that allow the calculation of imports and exports unitedly by adding the demand dimension to Balassa's RCA index and eliminating the double count in 1991. There are many studies in the literature that analyze the international competitiveness of product groups or sectors by determining their comparative advantages. The most frequently used methods in calculating competitiveness in these studies are Balassa's (1965) RCA index and Vollrath's (1991) RTA, RC, and LNRXA indices.

In the light of the above-mentioned issues, our study aims to analyze the trade competitiveness of selected agricultural product groups and the change in competitiveness between 2009-2020 in Turkey. In this context, before discussing the trade competitiveness of Turkey's agricultural products in our study, we will examine

the structure of the Turkish agricultural sector, the contribution of the agricultural sector to the Turkish economy, and Turkey's agricultural policies.

The outline of the study comprises three parts. In the first chapter, we will examine the structure of the agricultural sector in Turkey. In this context, we will present information about the geography, climate, and population of Turkey. Besides, we will examine the structure of agricultural enterprises and agricultural production. Finally, we will investigate the contribution made by the Turkish agricultural sector to the economy in terms of gross domestic product, employment, and foreign trade. In the second chapter, we will examine the agricultural policies implemented in Turkey. In this context, first, we will discuss the objective and scope of agricultural policies, and then we will explore the change process of agricultural policies implemented in Turkey between the years 1923-2000. Finally, in the 2nd chapter, the agricultural policies implemented after 2000 will be discussed within the scope of the data obtained from the annual programs and five-year development plans published by the official institutions. In addition, Turkey's basin-based agricultural support model and the 2019-2023 strategic plan of the Ministry of Agriculture and Forestry will be evaluated. In the third chapter of the study, we will analyze the trade competitiveness of the selected agricultural products in Turkey between the years 2009-2020 using the RCA, RTA, RC, LNRXA indices in the world market. In addition, we will use the TBI index to examine Turkey's foreign trade balance in the analyzed product groups. In this context, first, we will explore the theoretical background of competitiveness. Second, we will mention the studies conducted in the domestic and foreign literature, and then we will present information about the data and method used in analyses. Third and lastly, in the conclusion part, we will evaluate the results of the trade competitiveness analyses.

CHAPTER ONE

THE STRUCTURE AND MACROECONOMIC INDICATORS OF THE TURKISH AGRICULTURAL SECTOR

In this part of the study, first, we will present information about Turkey's geographical and demographic characteristics. Then we will examine the scope and features of the agricultural sector. Second, we will discuss the concept and classification of agricultural enterprises in Turkey. Third, we will focus on the structure of agricultural production in Turkey. Fourth and lastly, we will examine the contribution made by the agricultural sector to gross domestic product, employment, and foreign trade in Turkey.

1.1. A Review of Geography, Climate and Population of Turkey

“The Republic of Turkey lies in the Northern Hemisphere where the “Old World Continents” (Asia, Africa, and Europe) meet. Its total land border is 2.875 km, shared with Greece (203 km) and Bulgaria (269 km) on the northwest, with Georgia (276 km) on the northeast, with Armenia (325 km), Azerbaijan (18 km), and Iran (529 km) on the east, and with Iraq (378 km) and Syria (877 km) on the south. The total length of the sea border is 8.333 km. Turkey’s surface area is 780.043 km², 97% of which lies in Asia and the remaining 3% in Europe. Turkey’s land area (excluding water bodies) is 769.604 km². For comparison, this is about equal in size to countries Mozambique or Zambia in Africa or Chile in South America, almost as large as the total land area of France and UK, and a bit larger than the state of Texas, USA”.¹

“The Turkish shoreline stretches for 8.210 km along the Mediterranean Sea in the south, the Aegean Sea in the west, and the Black Sea in the north. In the northwest, there is the important inland Sea of Marmara, between the straits of the Dardanelles and the Bosphorus, important waterways that connect the Black Sea with the rest of

¹ Ed. by. H. Muminjanov, and A. Karagöz, **Biodiversity of Turkey Contribution of Genetic Resources to Sustainable Agriculture and Food Systems**, FAO, and Republic of Turkey Ministry of Agriculture and Forestry, 2018, p. 3

the world”² Turkey is divided into 81 administrative geopolitical provinces and seven non-political geographical regions. These geographical regions are:

- a) Aegean
- b) Marmara
- c) Black Sea
- d) Eastern Anatolia
- e) Southeastern Anatolia
- f) Mediterranean
- g) Central Anatolia

“Turkey has four seasons, but the climate varies widely across the country. Turkey experiences both maritime and continental weather patterns which, combined with its highly varied topography, cause extreme geo-climatic diversity. The Black Sea region in the north receives rain throughout the year and has both mild summers and mild winters. The southern coastal Mediterranean region is regarded as subtropical, characterized by hot, dry summers and mild, rainy winters. The Aegean region has mountains that run roughly east to west and are interspersed with grassy floodplains. This region also has a Mediterranean type of climate with hot, dry summers and mild winters. Central Anatolia is a vast high plateau with an average altitude of 1.132 meters above sea level and a semi-arid continental climate with hot and dry summers and cold winters. The southeast region records very low humidity levels, while the coastal regions have quite high levels, in line with precipitation rates. Snow can be seen almost everywhere in Turkey, but the number of snowy days and the period covered by snow differ from region to region. There are one or fewer snowy days in the Mediterranean and Aegean regions, whereas in parts of eastern Anatolia there can be up to 120 days of snow. On the high mountains, snow cover can be seen throughout the year, which melts slowly”³

² H. Muminjanov, and A. Karagöz, **op. cit.**, p. 4

³ FAO, Country Profile - TURKEY, 2008, p.3 (Online Access),
<https://www.fao.org/publications/card/en/c/CA0351EN/>, 08.09.2021

In 2020, the population of Turkey was estimated at 83.4 million. The average population density was 109.5 inhabitants/km². The number of people participating in the labor force was 32.3 million. The rural population declined from 35.2% in 2000 to 23.8% in 2020.⁴ According to the data of TURKSTAT for the year 2020, Turkey's total agricultural area is 37.753 thousand hectares (this includes meadow and pasture land). The agricultural area per capita in 2020 is approximately 0.44 hectares.

Figure 1.1: Map of Turkey



Source: FAO, Country Profile - TURKEY, 2008

1.2. The General Characteristics of the Agricultural Sector

The beginning of agricultural activities is as old as human history. Throughout history, agriculture has been one of the most significant activities that meet the functions such as nutrition, clothing, and shelter, which are necessary for the survival of people. Agricultural activities include farming, animal husbandry, fishing, and forestry activities. Nowadays, with the development of modern inputs and technologies and their use in the agricultural sector, the scope of agricultural activities has expanded. In addition to input production, the agricultural sector has

⁴ World Bank Database, Country – Turkey, (Online Access), <https://data.worldbank.org/country/turkey>, 09.09.2021

become a sector that performs functions such as increasing the quality and efficiency of the products produced, processing, marketing, transportation, distribution, and packaging.⁵

Considering it as part of the economic system, agriculture has been the cornerstone of the economy for a large period of time and has provided the necessary resources for the development of non-agricultural sectors. Nowadays, although the share of agriculture in the economy in developed countries has decreased with technological developments, it has not lost its strategic importance due to its basic functions. Because of this strategic importance, developed countries have attached more importance to the agricultural sector than developing countries and have implemented many different policies in order to prevent the decline in rural populations. Today, the countries that have completed their industrialization remain the most developed countries in the field of agriculture. From the point of view of developing and underdeveloped countries, the agricultural sector continues its function as the most important source of livelihood for people living in rural areas. In these countries, the share of the agricultural sector in economic development is greater than in developed countries.

The agricultural sector has different characteristics from other sectors in economic, social, and technical aspects. This sector evaluates the resources that are the subject of production within itself and creates resources for other sectors. For this reason, states are making precautionary interventions in the agricultural sector.⁶

The agricultural sector is dependent on nature. The fact that the agricultural sector is a biological process dependent on nature is the most significant characteristic that distinguishes it from the industrial and service sectors. The dependence of the agricultural sector on nature, soil, and climatic conditions directly affects the quantity and quality of agricultural production. Adverse climatic conditions such as drought, frost, flood, and storms occurring all over the world can

⁵ Ed. by. S. Erdoğan, and A. Gedikli, **The Transformation of the Turkish Economy**, Umuttepe Publications, 1st Edition, 2016, p. 220

⁶ M. Akman, “‘Agricultural Policies Applied in Turkey After 1990 Investigation in the Framework of Budget Policies’”, **Dokuz Eylül University Open Research Archive**, Master Thesis, 2006, p. 2

destroy all agricultural products depending on the degree of disasters. Therefore, agricultural production is more open to risk and uncertainty than other sectors because it is dependent on soil and climatic conditions that are impossible for people to control. This feature makes the agricultural sector vulnerable to demand and supply shocks and causes sudden changes in agricultural product prices.

The products that are the subject of production undergo a biological process. Agricultural production is a living process, and all living things develop depending on a determined time. Although there are differences in development times between product varieties, it is impossible to save time by eliminating growing stages. On the contrary, thanks to the intensive use of technology in the industrial and service sector, there are unlimited possibilities to shorten the production time.

The law of diminishing returns is valid within the agricultural sector. The use of capital-intensive input to elevate the number of products received from the unit area is possible up to a certain point. This situation prevents the intensive use of capital in the agricultural sector.

Prices of agricultural products are formed in markets close to perfect competition. Agricultural products are homogeneous. Since there are a lot of buyers and sellers on the market, the impact of production units on the prices is limited.

Some risks and uncertainties exist within production and marketing. Agricultural production depends on the seasons. The stages that each product will undergo in its cultivation are carried out according to a determined sequence and time.⁷

“The prices of agricultural products tend to fall, while the prices of raw materials and other industrial machinery and equipment that producers need to buy are increasing. In this case, for the standard of living of the producers to remain at the level of its counterparts in cities, it is necessary to increase the level of production and productivity.”⁸

⁷ H. A. Cinemre, and O. Kılıç, **Agricultural Economy**, Textbook No:11, 5th Edition, 2015, p. 179

⁸ M. Akman, **op. cit.**, p. 3

Storage of agricultural products and their preservation increases production costs. Therefore, the producers tend to sell their products without accumulating them in storage. Based on that, the products are sold at low prices, which leads to a decrease in the producers' revenues.⁹

1.3. Agricultural Enterprises

“An agricultural enterprise is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form or size”. Agricultural enterprise management may be exercised by an individual or household or by a legal person such as a corporation, cooperative, or government agency.¹⁰ Agricultural enterprises are understood objectively as commercial assets engaged in agricultural activity. “Agricultural activity can be defined as crop and animal production using soil and seeds or processing the agriculture-related products in the form of full and semi-finished products”.¹¹

1.4. The Classification of Agricultural Enterprises in Turkey

Like all enterprises, agricultural enterprises are classified according to different criteria and principles. The most common classification methods amongst all are economic size, product type, and land size. In particular, economic size classification provides accurate information and enables enterprises to be compared with others in different fields. However, due to the lack of sufficient data on the economic size and product types, the land size of the enterprises was generally used in comparisons.

⁹ M. Akman, **op. cit.**, p. 3

¹⁰ TURKSTAT, Statistical Indicators 1923-2013, 2014, p. 167, (Online Access), <https://teyit.fra1.cdn.digitaloceanspaces.com/wp-content/uploads/2019/11/istatistikgostergeler.pdf>, 05.09.2021

¹¹ E. Rehber, and H. Vural, **Agriculture Economics**, Ekin Press and Distribution, 2nd Edition, 2018, p. 88

1.4.1. The Classification of Turkish Agricultural Enterprises According to Their Land Sizes

“Since soil is the main factor in the production of agricultural products, the width, quality, and distribution of arable land among enterprises affect the amount and composition of agricultural production”.¹² The area under the ownership of the agricultural enterprises consists of owned lands(including titled or entitled and privileged lands such as owner), leased lands, and shared lands.¹³ Statistics on agricultural structure and wealth are compiled from two sources in Turkey. These are agricultural censuses and current agricultural statistics. Data on current agricultural statistics are collected by TURKSTAT in cooperation with the nationwide network of the Ministry of Agriculture and Forestry.¹⁴ Firstly, in this section, we will divide agricultural enterprises into five separate groups according to the size of the land they own. These groups are respectively;

- a) Enterprises with sizes from 1 to 19 decare (1-19)
- b) Enterprises with sizes from 20 to 49 decare (20-49)
- c) Enterprises with sizes from 50 to 99 decare (50-99)
- d) Enterprises with sizes from 100 to 199 decare (100-299)
- e) Enterprises with sizes from 200 to 499 decare (200-499)
- f) Enterprises with sizes from 500 or more decare (500+)

Table 1.1: Total Number of Enterprises and Owned Area by Enterprises in Turkey

Year	Number of Agricultural Enterprises	Area Owned by Agricultural Enterprises (Decare)
1970	3058905	170649940
1980	3650910	227640289
1991	3966822	234510993
2001	3022127	184348232

Source: Compiled from TURKSTAT, Statistical Indicators 1923-2013, pp. 169-171

The last official data on the total number of agricultural enterprises and the total amount of land owned by these enterprises belong to 2001. While the agricultural enterprises in Turkey were around 3 million in 1971, this number

¹² S. Erdoğan, and A. Gedikli, *op. cit.*, p. 223

¹³ TURKSTAT, *op. cit.*, p. 167

¹⁴ *Ibid.*, p. 168

increased to 3.7 million in 1981 and approximately 4 million in 1991. In 2001, the number of enterprises decreased to the level of 1971.

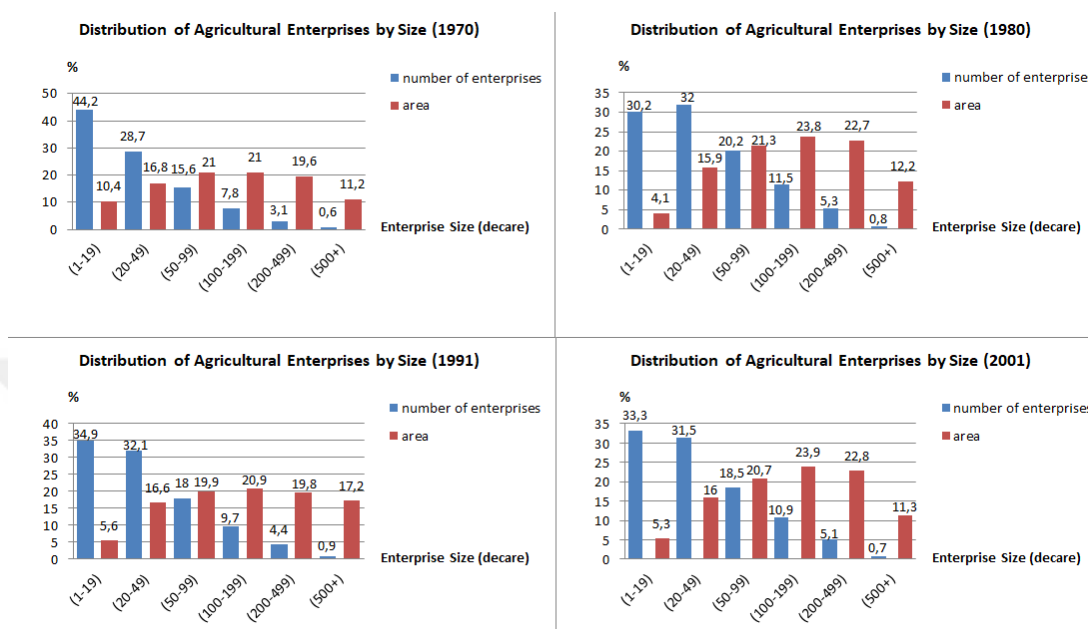
The distribution of agricultural enterprises according to the size of the land they own and the change over time provide us with information about the agricultural production structure of the country. Having too many small enterprises may indicate that usage of traditional agriculture is more intense in that country. On the other hand, having too many large enterprises may point out that usage of advanced agriculture is widespread.

When we examined the data presented in Graph 1.1, we can observe that the 1-19 decare group, in which the number of enterprises concentrated in 1970, operated 10.4% of the agricultural lands. Groups in which the amount of land is most concentrated at a rate of 21% are groups of 50-99 and 100-199 decares in size. In 1970, 88.5% of agricultural enterprises owned less than 100 decares of land. These enterprises hold 48.2% of the total land amount.

In 2001, the group with the highest concentration of enterprises continued to be 1-19. But the share of 1-19 in a total number of enterprises decreased from 44.2% to 33.3%. The decrease in the amount of land owned by enterprises larger than 500 decares in 2001 compared to 1991 indicates that large enterprises are being fragmented.

In general, the number of enterprises continued to be concentrated in small ones. The land density owned by medium-sized groups remained at the same level in the 1970-2001 period. Finally, in 2001, 83.3% of agricultural enterprises were classified as smaller than 100 decares. The lands owned by these enterprises constitute 42% of the total agricultural land. With all this information, we can say that the structure of enterprises in our country in the 1971-2001 period was small-scale. This situation imposes constraints on the efficient use of agricultural lands.

Graph 1.1: The Distribution of Agricultural Enterprises by Size in Turkey (1970, 1980, 1991, 2001)

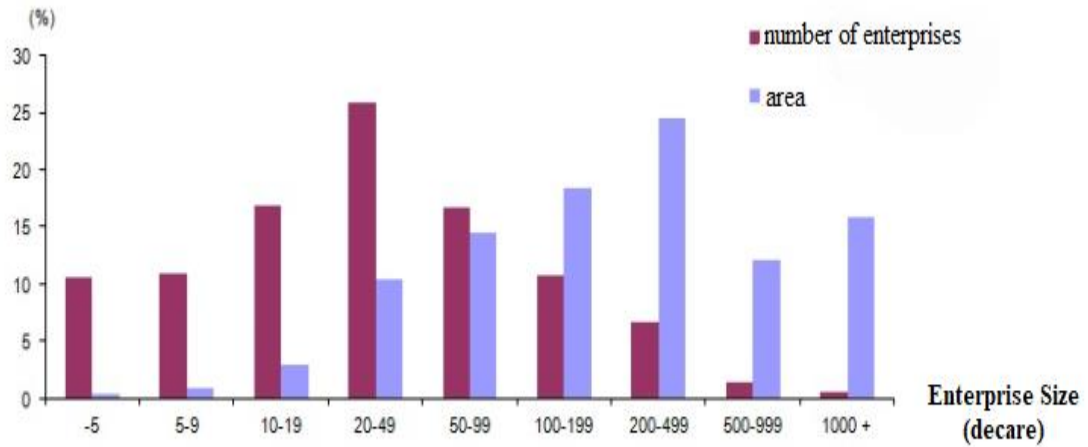


Source: Authors' Calculations¹⁵

The last official data published on this subject is based on the Agricultural Enterprise Structure Research made by TUIK in 2016. When we examined the data presented in Graph 1.2, we observed that the 20-49 decare group, in which the number of enterprises concentrated in 2016, operated 11% of the agricultural lands. On the other hand, the group where the amount of land is concentrated the most is the group with a size of 200-499 decares. Furthermore, 80.7% of agricultural enterprises are smaller than 100 decares, and the lands owned by these constitute 29.1% of the total agricultural land. Compared to 2001, the amount of land owned by enterprises with more than 100 decares increased by 12.9%. In the light of all these observations, we can say that the structure of agricultural enterprises in Turkey continued to be small-scale in 2016, but the agricultural lands held by these enterprises started to shift towards medium and large-scale enterprises.

¹⁵ Based on the data of TURKSTAT, Statistical Indicators 1923-2013, 2014

Graph 1.2: The Distribution of Agricultural Enterprises by Size in Turkey (2016)



Source: TURKSTAT, Agricultural Enterprise Structure Research 2016

In addition to the land size of the enterprises, one of the factors affecting agricultural activity and efficiency is the number of pieces of the land. Especially the small and fragmented land structure makes it difficult to apply modern techniques and directly affects the growth of productivity.¹⁶

Regarding this issue, Table 1.2 presents the distribution of agricultural enterprises according to the number of parcels in 1980, 1991, and 2001. According to these, the number of land parcels decreased in 1980-2001. However, despite the positive outlook, 23.1% of enterprises had a land parcel count of six or more in 2001 is a significant indicator that the problem is not over yet.

TURKSTAT shared the last official data related to the subject in 2016. In Table 1.3, the number of parcels per enterprise and the average parcel size in 2016 are compared with 2001. Between 2001-2016, the number of parcels per enterprise increased from 4.07 to 5.9, while the average parcel size decreased from 14.95 to 12.9. Unfortunately, the improvement observed in 1980-2001 did not continue between 2001-2016. Especially the number of parcels of enterprises with a size of

¹⁶ K. Ekinici, and M. Sayılı, A Review of Legislation to Prevent Fragmentation of Agricultural Land, Gaziosmanpaşa University, **Journal of the Faculty of Agriculture**, Vol.27, 2010, p. 124

1000 decare and more increased approximately five times and their average size decreased by %78.5 in this period.

Table 1.2: The Distribution of Agricultural Enterprises by Number of Parcels in Turkey (%)

number of parcels	1980	1991	2001
(1 - 3)	35,7	43,3	56,5
(4 - 5)	22,4	22,8	20,4
(6 - 9)	22,2	19,1	16,0
(10+)	19,7	14,8	7,1
Total	100	100	100,0

Source: K. Ekinici and M. Sayılı, A Review of Legislation to Prevent Fragmentation of Agricultural Land, Gaziosmanpaşa University, **Journal of the Faculty of Agriculture**, Vol.27, 2010, pp. 121-129

Table 1.3: The Number of Parcels of Agricultural Land per Agricultural Enterprise and Average Parcel Size of Agricultural Land in Turkey

Enterprise size (decare)	2001		2016	
	Number of parcels of agricultural land per enterprise	Average parcel size of agricultural land (decare)	Number of parcels of agricultural land per enterprise	Average parcel size of agricultural land (decare)
Total	4,07	14,95	5,9	12,9
(0 - 5)	1,6	1,6	1,5	1,6
(5 - 9)	2,2	2,9	2,4	2,7
(10 - 19)	3,05	4,4	3,4	3,8
(20 - 49)	4,02	7,7	4,7	6,4
(50 - 99)	5,06	13,4	6,9	9,4
(100 - 199)	5,7	23,3	10,1	12,9
(200 - 499)	6,4	42,2	13,7	20,6
(500 - 999)	7,8	82,4	21,1	30,3
(1000+)	7,6	281,4	36,9	60,3

Source: Compiled from TURKSTAT, General Agricultural Census Household Survey Results in Agricultural Enterprises, 2001, and Agricultural Enterprise Structure Research 2016, 2018

1.4.2. The Classification of Turkish Agricultural Enterprises According to Their Product Type

Another method used in classifying agricultural enterprises is classification according to product groups. The European Union Statistical Office has divided agricultural enterprises into nine different classes according to their product types. These groups are respectively;

- a) P1 specialized field crops (wheat, maize, rice, dry pulses and similar products)
- b) P2 specialized in horticulture (vegetables and flowers)
- c) P3 specialized permanent crops (fruits and berries, citrus plants, olives, vineyards, and other permanent crops)
- d) P4 specialized grazing livestock (bovine animals, sheep, and goats)
- e) P5 specialized granivores (poultry and rabbits (breeding females))¹⁷
- f) P6 mixed crop production
- g) P7 mixed livestock production
- h) P8 mixed crop-livestock production
- i) P9 un-classified enterprises

Agricultural enterprises in Turkey were classified by following EU procedure and using the Agricultural Enterprises Structure Survey made by TURKSTAT in 2016. Each agricultural enterprise has taken one of the eight types like P1, P2, P3, P4, P5, P6, P7, P8. Since no non-classified agricultural enterprise was determined, P9 is not included in Table 1.4.¹⁸

Table 1.4 presents the distribution of typology classes of Turkish agricultural enterprises in 2006 according to different economic sizes. Accordingly, field crops

¹⁷ It includes enterprises rearing poultry or rabbits (breeding females) in addition to crop production or bovine animal or sheep and goat husbandry.

¹⁸ TURKSTAT, Metadata of Distribution of Enterprises by Economic Size and Typology Classification, 2006, (Online Access), <https://data.tuik.gov.tr/Kategori/GetKategori?p=tarim-111&dil=2>, 13.09.2021

production took the largest share in the average distribution with 25.7%. After this group, the largest share belongs to mixed crop-livestock farming with 21.7% and permanent crop production with 19.8%.

Table 1.4: The Distribution of Agricultural Enterprises by Economic Size and Typology Classes in Turkey (2006)

Typolgy Class / Economic Size	Economic Size Group (TL)										
	Average	0 < 2 000	2 000 < 4 000	4 000 < 8 500	8 500 < 13 000	13 000 < 17 000	17 000 < 26 000	26 000 < 35 000	35 000 < 86 000	86 000 < 200 000	200 000 and +
P1	25,7	35,4	19,1	19,3	20,6	22,7	22,9	36,6	44,4	68,8	33,5
P2	1,0	1,4	0,8	0,5	0,3	1,5	1,2	6,1	3,2	0,4	3,6
P3	19,8	23,5	20,6	17,2	15,1	13,4	16,0	11,9	13,7	9,6	21,0
P4	16,7	10,6	18,2	20,6	23,8	20,5	22,5	20,2	9,6	9,3	4,7
P5	0,1	0,1	-	0,0	0,0	0,0	-	-	0,3	0,2	21,8
P6	9,1	7,9	10,8	9,8	8,6	8,5	6,5	5,5	7,1	3,5	9,4
P7	6,1	3,7	7,5	7,0	7,5	8,8	8,7	4,1	4,8	0,9	0,5
P8	21,7	17,5	23,1	25,6	24,2	24,4	22,2	15,6	17,0	7,4	5,5
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Source: Compiled from TURKSTAT, Agricultural Enterprise Structure Research 2006, 2008

1.4.3. The Classification of Turkish Agricultural Enterprises According to Their Economic Size

Economic size is the monetary value obtained by multiplying the standard output values calculated based on the product (per decare for crop production, per head for animals) by the land sizes used on a product basis and animal assets for each enterprise. Standard output means value in one unit for crop and animal production. The standard output of an agricultural product (crop or livestock) is the average monetary value of the agricultural output at the farm-gate price, per decare, or head of livestock.¹⁹

TURKSTAT published the latest data on the concept of the economic size of agricultural enterprises in 2018. Table 1.5 presents the distribution of agricultural enterprises according to 6 different economic size groups in 2016. According to this table, the groups with the highest concentration of the number of agricultural enterprises were 6660 TL < 26640 TL group with 36.3%, followed by 26640 TL < 83250 TL group with 27.5%. %58 of agricultural enterprises in Turkey are below the

¹⁹ TURKSTAT, Metadata of Agricultural Enterprise Structure Research, 2016, (Online Access), <https://data.tuik.gov.tr/Kategori/GetKategori?p=tarim-111&dil=2>, 14.09.2021

value of 26640 TL. In the light of these data, we have concluded that agricultural enterprises in Turkey have a small structure according to their economic size.

Table 1.5: The Distribution of Agricultural Enterprises by Economic Size in Turkey (2016)

Economic Size Group (TL)	Total Enterprises (%)
Total	100,0
<6 660	21,7
6 660 < 26 640	36,3
26 640 < 83 250	27,5
83 250 < 333 000	12,7
333 000 < 832 500	1,4
832 500 +	0,3

Source: Compiled from TURKSTAT, Agricultural Enterprise Structure Research 2016, 2018

1.5. Agricultural Production in Turkey

“Agricultural activities are handled under four main headings. These are farming, husbandry, forestry, and fishing. Among these four activities, farming and husbandry occupy the largest share in the Turkish agricultural sector”.²⁰

Table 1.6: The Structure of Agricultural Production in Turkey (at current prices, billion TL)

Year	Total	Farming and Husbandry	%	Forestry	%	Fishery	%
1980	1.367,60	1.304,40	95,3	45,1	3,2	18,1	1,5
1990	68.692	63.640,60	92,6	2.902,50	4,2	2.148,90	3,2
2000	17.540.631,20	16.564.936,10	94,4	423.482,40	2,4	552.212,80	3,2
2005	49.957.330,40	46.141.237,20	92,3	1.756.925,40	3,5	2.059.167,90	4,2

Source: Ed. by. Erdoğan and Gedikli, The Transformation of the Turkish Economy, 1st Edition, Umuttepe Publications, 2016, p. 223

Table 1.6 presents the distribution of 4 different agricultural activity groups within the agriculture sector by years. According to this table, the basis of the agricultural sector consists of farming and husbandry. In Turkey, which is surrounded by seas on three sides, fishing has remained in the background compared to other agricultural activities.

²⁰ S. Erdoğan, and A. Gedikli, **op. cit.**, p. 223

1.5.1. The Crop Production in Turkey

The main factor of production in agricultural production is soil. The amount of arable land owned by the countries and the geographical characteristics of the country directly affect crop production. The geographical structure of Turkey provides positive features in terms of agricultural production and agricultural product diversity. Based on this, Turkey has been referred to as an agricultural country for many years.

Table 1.7 presents the usage areas of agricultural lands located in Turkey. According to this table, it is observed that mainly field agriculture is carried out on agricultural lands. According to the data for 2020, from 37.7 million hectares of agricultural land, about 19.5 million consists of arable land. Of the remaining area, 3.5 million hectares is composed of land under the permanent crops, and 14.7 million hectares is meadow and pasture land. When the total utilized agricultural lands are examined, it is observed that the amount of land, which was 40 million hectares in 1991, decreased by 9% to 37.7 million hectares in 2020. This decline accelerated particularly after 2006. The years when the total amount of utilized agricultural land was the most are 2004 and 2005. The share of arable land in total utilized agricultural land was 61.5% in 1991. Later, the share of arable land in the total utilized land decreased to 57.9% in 2001 and 51.8% in 2020. According to the data examined, the amount of meadow and pasture lands was 12,3 million hectares between 1991-2000 and increased to 14.6 million hectares after 2000. The amount of forest areas has increased from 20,1 million hectares in 1991 to 22.7 million hectares in 2020.

Table 1.7: Agricultural Land and Forest Areas of Turkey (Thousand Hectares)

Year	Total utilized agricultural land	Total arable land	Area of cereals and other crop products		Area of vegetable gardens	Area of ornamental plants	Total land under permanent crops	Area of other fruits, beverage and spices crops	Area of vineyard	Area of olive trees	Land under permanent meadows and pastures	Forest area
			Sown area	Fallow land								
1991	40 032	24 631	18 776	5 203	652	-	3 023	1 560	586	877	12 378	20 199
1992	39 953	24 563	18 811	5 089	663	-	3 012	1 565	576	871	12 378	20 199
1993	39 913	24 481	18 940	4 887	654	-	3 054	1 615	567	872	12 378	20 199
1994	40 049	24 605	18 641	5 255	709	-	3 066	1 618	567	881	12 378	20 199
1995	39 212	24 314	18 252	5 124	938	-	2 520	1 399	565	556	12 378	20 199
1996	39 364	24 457	18 469	5 094	894	-	2 529	1 401	560	568	12 378	20 199
1997	39 241	24 239	18 431	4 917	891	-	2 624	1 422	545	658	12 378	20 199
1998	39 344	24 362	18 561	4 902	899	-	2 604	1 463	541	600	12 378	20 199
1999	39 179	24 213	18 260	5 039	914	-	2 588	1 458	535	595	12 378	20 763
2000	38 757	23 768	18 038	4 826	904	-	2 611	1 476	535	600	12 378	20 763
2001	40 967	23 740	17 917	4 914	909	-	2 610	1 485	525	600	14 617	20 763
2002	41 196	23 905	17 935	5 040	930	-	2 674	1 524	530	620	14 617	20 763
2003	40 644	23 310	17 408	4 991	911	-	2 717	1 562	530	625	14 617	20 763
2004	41 210	23 813	17 962	4 956	895	-	2 780	1 616	520	644	14 617	20 763
2005	41 223	23 775	18 005	4 876	894	-	2 831	1 653	516	662	14 617	21 189
2006	40 493	22 981	17 440	4 691	850	-	2 895	1 670	514	712	14 617	21 189
2007	39 504	21 979	16 945	4 219	815	-	2 909	1 671	485	753	14 617	21 189
2008	39 122	21 555	16 460	4 259	836	-	2 950	1 693	483	774	14 617	21 189
2009	38 912	21 351	16 217	4 323	811	-	2 943	1 686	479	778	14 617	21 390
2010	39 011	21 384	16 333	4 249	802	-	3 011	1 749	478	784	14 617	21 537
2011	38 231	20 523	15 692	4 017	810	4	3 091	1 820	473	798	14 617	21 537
2012	38 399	20 581	15 463	4 286	827	5	3 201	1 925	462	814	14 617	21 678
2013	38 423	20 574	15 613	4 148	808	5	3 232	1 937	469	826	14 617	21 678
2014	38 558	20 699	15 782	4 108	804	5	3 243	1 950	467	826	14 617	21 678
2015	38 551	20 650	15 723	4 114	808	5	3 284	1 985	462	837	14 617	22 343
2016	38 328	20 382	15 575	3 998	804	5	3 329	2 048	435	846	14 617	22 343
2017	37 964	19 998	15 498	3 697	798	5	3 348	2 085	417	846	14 617	22 343
2018	37 797	19 723	15 421	3 513	784	5	3 457	2 176	417	864	14 617	22 622
2019	37 716	19 580	15 398	3 387	790	5	3 519	2 235	405	879	14 617	22 740
2020	37 753	19 572	15 615	3 173	779	5	3 564	2 276	401	887	14 617	22 740

Source: TURKSTAT, Agricultural Land and Forest Areas, and Statistical Indicators 1923-2013

1.5.1.1. The Analysis of Turkish Crop Products

In this part of the study, we created four main groups in order to examine the general change in the production, export, import, and consumption values of Turkish crop products. While creating these four main groups, we gathered data on the basis of the product reported by TURKSTAT and combined them under the main headings of cereals, dry pulses, fruits, nuts and beverage crops, and vegetables.

Table 1.8 presents the cereals, dry pulses, vegetables, and fruits, nuts and beverage crops produced in Turkey between 2007 and 2014. According to the total usable production amount, cereals have the largest share in crop production, and the most produced products after cereals are vegetables and fruits, respectively.

The production of cereals, which was 27.1 million tons in 2007, increased by 11.67% and reached 30.2 million in 2014. Domestic use of cereal products, which was 28.6 million tons in 2007, increased by 22.34% and increased to 35 million tons in 2014. Between 2007 and 2014, the increase in domestic use of cereals was more than the increase in production. Cereal export, which was 2.1 million tons in 2007, increased by 130.3% and reached 4.87 million tons in 2014. Between 2007 and 2014, the highest export of cereals was in 2009. Cereal import, which was 4.2 million tons in 2007, increased by 106.9% and reached 8.7 million tons in 2014. Between 2007-2014, Turkey had a foreign trade deficit in cereals except for 2009.

The production of dry pulses, which was about 1.24 million tons in 2007, decreased by 17.97% to 1 million tons in 2014. The domestic use of dry pulses, which was about 1.1 million tons in 2007, increased by 4.28% to 1.2 million tons in 2014. While there was an increase in the domestic use of pulses between 2007 and 2014, the production of dry pulses decreased. Export of dry pulses, which was 231 thousand tons in 2007, decreased by 1.69% to 222 thousand tons in 2014. Between 2007-2014, the highest dry pulses export was in 2009. Dry pulses import, which was 148 thousand tons in 2007, increased by 180.6% and reached 417 thousand tons in 2014. In the 2007-2014 period, except for 2007 and 2012, Turkey had a foreign trade deficit in dry pulses.

Table 1.8: The Balance Table of Turkish Crop Product Groups (2007 - 2014)

Products	Year	Supply=Use (Tonnes)	Usable production (Tonnes)	Imports (Tonnes)	Domestic use (Tonnes)	Exports (Tonnes)	Degree of self- sufficiency (%)
Cereals (total)	2014/'15	39 059 713	30 275 090	8 784 623	35 029 184	4 879 666	86,4
	2013/'14	40 362 837	34 716 665	5 646 172	35 142 235	5 178 228	98,8
	2012/'13	36 355 889	30 819 561	5 536 328	33 114 354	4 149 281	93,1
	2011/'12	36 936 934	32 512 681	4 424 253	32 529 485	4 395 131	99,9
	2010/'11	34 823 437	30 258 051	4 565 386	30 620 823	3 399 462	98,8
	2009/'10	34 697 980	31 120 593	3 577 387	28 361 627	5 829 538	109,7
	2008/'09	31 325 886	27 065 775	4 260 111	29 204 355	2 650 467	92,7
	2007/'08	31 354 613	27 110 365	4 244 247	28 630 392	2 118 717	94,7
Dried pulses (total)	2014/'15	1 436 202	1 018 411	417 791	1 208 191	228 011	84,3
	2013/'14	1 502 175	1 127 903	374 272	1 269 364	232 811	88,9
	2012/'13	1 382 199	1 170 063	212 136	1 163 753	218 446	100,5
	2011/'12	1 410 743	1 112 532	298 211	1 152 654	258 089	96,5
	2010/'11	1 518 470	1 213 918	304 552	1 267 693	250 777	95,8
	2009/'10	1 385 362	1 083 445	301 917	1 127 020	258 342	96,1
	2008/'09	1 122 924	843 011	280 028	900 938	222 051	93,6
	2007/'08	1 390 453	1 241 608	148 845	1 158 503	231 950	107,2
Vegetable (total)	2014/'15	25 926 960	25 847 592	79 368	24 221 738	1 705 222	106,7
	2013/'14	25 777 964	25 699 604	78 360	23 993 148	1 784 816	107,1
	2012/'13	25 318 410	25 264 074	54 336	23 708 459	1 609 951	106,6
	2011/'12	24 806 199	24 606 060	200 139	23 178 833	1 627 366	106,2
	2010/'11	23 414 500	23 341 717	72 783	21 865 053	1 549 447	106,8
	2009/'10	24 198 080	24 140 367	57 713	22 363 298	1 834 782	107,9
	2008/'09	24 458 920	24 412 543	47 117	22 835 267	1 631 883	106,9
	2007/'08	23 118 471	23 072 020	46 451	21 647 484	1 470 987	106,6
Fruits, nuts and beverage crops (total)	2014/'15	21 396 645	20 496 358	900 287	14 496 815	7 241 311	141,3
	2013/'14	22 383 192	21 602 233	780 959	15 290 260	7 369 603	141,2
	2012/'13	22 232 542	21 344 276	888 266	15 694 493	6 627 684	135,9
	2011/'12	21 222 070	20 401 052	821 018	14 633 293	6 759 179	139,4
	2010/'11	21 126 315	20 326 101	800 214	14 343 754	6 704 513	141,7
	2009/'10	20 574 643	19 832 586	742 057	14 693 141	5 752 895	134,9
	2008/'09	19 338 843	18 691 285	647 559	13 038 009	5 739 286	143,3
	2007/'08	14 208 876	13 650 867	558 009	10 577 466	3 655 024	129,0

Source: Authors' Calculations²¹²¹ Based on the data of TURKSTAT, Crop Production Statistics

Due to lack of data, other citrus fruits and other nuts are not included in the calculations for 2007/'08.

Products included in the cereals group: barley, wheat, maize, oats, rye, other cereals.

Products included in the dry pulses group: dry bean, red lentil, chickpea, green lentil.

Products included in the vegetable group: green bean, okra, green pea, pepper, tomato, carrot, cucumber, spinach, squash, water melon, melon, dry garlic, dry onion, cabbage, lettuce, eggplant, leek, purslane, green onion, radish.

Products included in the fruit, nuts and beverage crops group: pistachio, pear, quince, almond, walnut, tea, strawberry, mulberry, apple, plum, hazelnut, grapefruit, fig, apricot, chestnut, cherry, lemon, mandarin, banana, pomegranate, orange, peach, grape, sour cherry, other nuts, other citrus fruits.

Vegetable production, which was 23 million tons in 2007, increased by 12% and reached 25.8 million tons in 2014. Domestic consumption of vegetables, which was 21.6 million tons in 2007, increased by 11.89% and reached 24.2 million tons in 2014. Between 2007 and 2014, the increase in the production of vegetables was more than the increase in their domestic use. Vegetable export, which was 1.47 million tons in 2007, increased by 15.9% and reached 1.7 million tons in 2014. Between 2007 and 2014, the year with the highest export of vegetables was 2009. In 2007-2014, there was no notable change in the import of vegetables, except for the sudden increase in 2011. Turkey had a foreign trade surplus in vegetables in the 2007-2014 period.

Fruits, nuts, and beverage crop production increased by 50.14% to 13.6 million tons in 2007 to 20.4 million tons in 2014. The production of fruits, nuts, and beverage crops, which was 13.6 million tons in 2007, increased by 50.14% and reached 20.4 million tons in 2014. Domestic use of fruits, nuts, and beverage crops, which was 10.5 million tons in 2007, increased by 37.05% and reached 14.49 million tons in 2014. Between 2007 and 2014, the increase in fruits, nuts, and beverage crop production was more than domestic use. Export of fruits, nuts, and beverage crops, which was 3.6 million tons in 2007, increased by 98.11% and reached 7.2 million tons in 2014. Between 2007 and 2014, the highest export of fruits, nuts, and beverage crops was in 2013. Import of fruits, nuts, and beverage crops, which was 558 thousand tons in 2007, increased by 61.33% and reached 900 thousand tons in 2014. Turkey had a foreign trade surplus in fruits, nuts, and beverage crops in the 2007-2014 period.

The most decisive data amongst all the information in the table is the self-sufficiency degrees of the crop product groups. Self-sufficiency is producing enough to meet the demand without being dependent on foreign sources. We can calculate the self-sufficiency ratio by dividing the usable production of the product for domestic use, then multiplying by one hundred.

Among the total crop products produced in Turkey between 2007-2014, the self-sufficiency levels of vegetables and fruits, nuts, and beverage crops are above

100%. The self-sufficiency of cereal products, on the other hand, was below 100%, except for 2009. In addition, although the self-sufficiency rate of cereal products is below 100%, they are above %90 in most years. The self-sufficiency rate of dry pulses, on the other hand, remained above %100 in 2007 and 2012. In particular, the self-sufficiency rate of dry pulses started to decrease after 2012.

Table 1.9: The Balance Table of Turkish Crop Product Groups (2015 - 2019)

Products	Year	Supply=Use (Tonnes)	Usable production (Tonnes)	Imports (Tonnes)	Domestic use (Tonnes)	Exports (Tonnes)	Degree of self- sufficiency (%)
Cereals (total)	2019/'20	46 920 589	31 710 927	15 209 662	36 116 987	8 440 029	87,8
	2018/'19	42 083 458	31 768 440	10 315 018	34 381 128	9 484 113	92,4
	2017/'18	43 267 182	33 438 503	9 828 679	34 125 205	8 238 796	98,0
	2016/'17	38 476 624	32 626 285	5 850 339	33 563 430	8 238 485	97,2
	2015/'16	40 631 294	35 793 654	4 837 640	32 479 732	6 588 743	110,2
Dried pulses (total)	2019/'20	1 780 098	1 210 226	569 872	1 277 987	469 975	94,7
	2018/'19	1 752 600	1 205 234	547 366	1 324 016	694 136	91,0
	2017/'18	1 650 875	1 143 670	507 205	1 330 519	320 356	86,0
	2016/'17	1 581 497	1 062 035	519 462	1 280 496	301 001	82,9
	2015/'16	1 495 025	1 060 905	434 120	1 223 404	271 621	86,7
Vegetable (total)	2019/'20	28 069 133	27 968 023	101 110	26 088 828	1 980 305	107,2
	2018/'19	27 349 636	27 191 393	158 243	25 557 512	1 792 124	106,4
	2017/'18	27 884 751	27 764 178	120 573	26 039 927	1 844 824	106,6
	2016/'17	27 322 487	27 239 801	82 686	25 530 222	1 792 265	106,7
	2015/'16	26 857 070	26 787 713	69 357	25 078 023	1 779 047	106,8
Fruits, nuts and beverage crops (total)	2019/'20	26 484 396	25 425 878	1 058 518	17 456 797	9 138 530	145,7
	2018/'19	27 351 910	25 868 989	1 482 921	17 765 267	9 983 648	145,6
	2017/'18	26 081 076	25 077 488	1 003 588	16 044 592	9 972 567	156,3
	2016/'17	23 939 952	22 934 079	1 005 873	15 877 100	8 506 297	144,4
	2015/'16	22 583 005	21 676 357	906 648	15 035 407	7 317 421	144,2

Source: Authors' Calculations²²

Table 1.9 presents the cereals, dry pulses, vegetables, and fruits produced in Turkey between 2015-2019. According to the total usable production amount, cereals have the largest share in crop production, and the most produced products after cereals are vegetables and fruits, respectively.

The production of cereals, which was 35.7 million tons in 2015, decreased by 11.4% to 31.7 million in 2019. Domestic use of cereals, which was 32.4 million tons

²² Based on the data of TURKSTAT, Crop Production Statistics
Products included in the groups are same with Table 1.10.

in 2015, increased by 11.19% and reached 36.1 million tons in 2019. Between 2015-2019, it was observed that the amount of production decreased while the domestic use of cereals increased. Cereal exports had reached the highest level across the five years, from 6.5 million tons in 2015 to 9.4 million tons in 2018. In 2015, 4.8 million cereal imports increased by 214% and reached 15.2 million tons in 2019. Turkey had a foreign trade deficit in cereals in the 2015-2019 period except for 2015 and 2016.

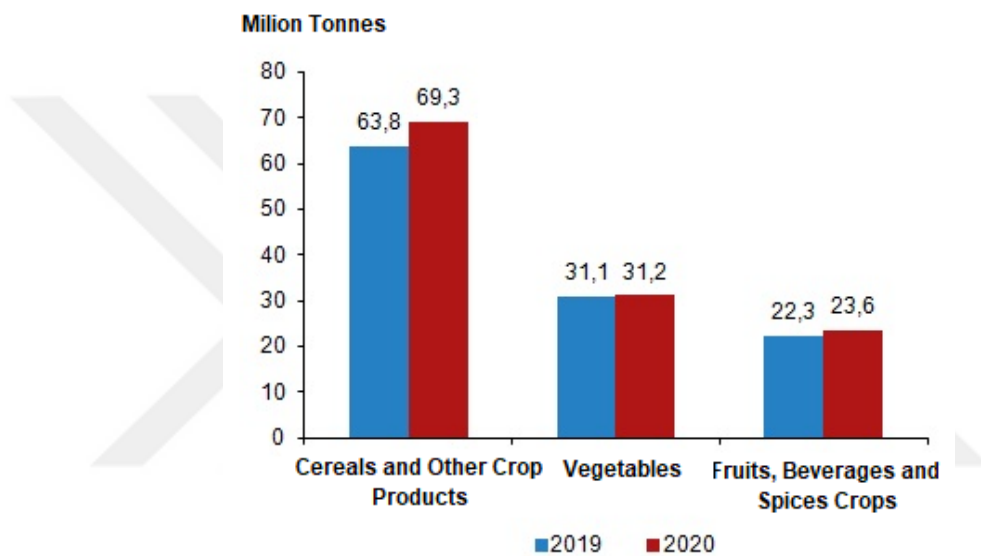
Dry pulses production, which was approximately 1 million tons in 2015, increased by 14% and reached 1.2 million tons in 2019. Domestic use of dry pulses, which accounted for 1.22 million tons in 2015, increased by 4.46% and became 1.27 million tons in 2019. Between 2015-2019, the increase in the production of dry pulses was more than the increase in its domestic use. Dry pulses export, which was 271 thousand tons in 2015, increased by 155% and rose to 694 thousand tons in 2018, then decreased to 469 thousand tons in 2019. Dry pulses import, which was 434 thousand tons in 2015, increased by 31.27% and reached 569 thousand tons in 2019. Turkey had a foreign trade deficit in dry pulses in this period except for 2018.

Vegetable production, which was 26.7 million tons in 2015, increased by 4.4% to 27.9 million tons in 2019. Domestic use of vegetables, which was 25 million tons in 2015, increased by 4.03% and reached 26 million tons in 2019. Between 2015-2019, the increase in the production of vegetables was more than the increase in their domestic use. Between 2015 and 2019, vegetable imports increased by 45.7%, and vegetable exports increased by 11.3%. Turkey had a foreign trade surplus in vegetables in this period.

The production of fruits, nuts, and beverage crops, which was 21.6 million tons in 2015, increased by 17.2% and reached 25.4 million tons in 2019. Domestic use of fruits, nuts, and beverage crops, which was 15 million tons in 2015, increased by 16.10% to 17.4 million tons in 2019. Between 2015-2019, the increase in fruit, nuts, and beverage crops production was more than the increase in its domestic use. In this period, imports of fruits, nuts, and beverage crops increased by 16.7%, while exports increased by 24.8%. Turkey had a foreign trade surplus in fruits, nuts, and beverage crops in this period.

Among the total crop products produced in Turkey between 2015-2019, the self-sufficiency levels of vegetables and fruits, nuts, and beverage crops are above 100%. The self-sufficiency of cereal products, on the other hand, was below 100%, except for 2015. The self-sufficiency rate of dry pulses remained below 100% between 2015-2019. In the light of all these observations, we can say that Turkey is not far from the goal of being a self-sufficient agricultural country.

Graph 1.3: The Crop Production Amount by Product Groups in Turkey (2019-2020)



Source: TURKSTAT, Crop Production Statistics, 2020

The changes in the production quantities of agricultural products in the years 2019-2020 are presented in Graph 1.3. Accordingly, cereal and other crop production, which was around 63.8 million tons in 2019, increased by 8.6% to 69.3 million in 2020. Again in the same period, vegetable production increased from 31.1 million tons to 31.2 million tons. On the other hand, the production of fruit, beverage, and spice crops increased by 5.82% from 22.3 million tons to 23.6 million tons.

The production amount of cereal products was 37.2 million tons in 2020. Compared to the previous year, wheat production increased by 7.9% to 20.5 million tons, barley production increased by 9.2% to 8.3 million tons, corn production increased by 8.3% to 6.5 million tons, oat production increased by 18% and became approximately 314.5 thousand tons. Edible broad bean production decreased by 8.8%

to around 5 thousand tons, and red lentils increased by 5.9% to about 328.4 thousand tons. At the same time, the production of tomato, dry onion, and pepper increased by 2.8%, 3.6%, and 4.6%, whereas the production of watermelon, melon, and cucumber decreased by 9.8%, 2.9%, and 1.6%. Besides, the production of apples increased by 18.8%, peaches by 7.4%, cherries by 9.1%, strawberries by 12.3%, and pomegranates by 7.3%. Finally, tangerines from citrus fruits increased by 13.3%, and pistachios from hard-shelled fruits increased by 248.7%.²³

Graph 1.4: The Crop Production Value and Annual Change Rates by Product Groups in Turkey (2019-2020)



Source: TURKSTAT, Crop Product Prices and Production Value, 2020

In 2020, the production value of cereals and other crop products increased by 22.99% to 97.37 billion TL, and the production value of vegetables increased by 9.59% to 55.28 billion TL. In addition, the production value of fruit, beverage, and spice crops increased by 36.46% to 92.56 billion TL.

When we compared 2019 to 2020, it is observed that there is an increase in both production amount and production value. However, the value of crop products increased more than the amount of production.

Turkey has an important place in world agriculture in terms of crop production. Turkey's share in world hazelnut production was 68.97% in 2019. In 2019, the share of Turkey's fig, quince, cherry, and apricot production in the share of world production was more than 20%. Between 2018-2019, Turkey's share of

²³ TURKSTAT, Crop Product Prices and Production Values, 2020

pistachio production in the world decreased by 14.48%, and Turkey's share of hazelnut production increased by 10.52%. There were no significant changes in the shares of Turkey's examined products in world production.

Table 1.10: The Share of Selected Turkish Crop Products in World Production

Product (Tonnes)	Turkey 2018	World 2018	Share (%)	Turkey 2019	World 2019	Share (%)	Change in share (%)
Pistachios	240000	1008479	23,80	85000	911829	9,32	-14,48
Figs	306499	1224852	25,02	310000	1315588	23,56	-1,46
Hazelnuts, with shell	515000	881061	58,45	776046	1125178	68,97	10,52
Quinces	176479	660562	26,72	180542	666589	27,08	0,37
Cherries	639564	2568446	24,90	664224	2595812	25,59	0,69
Apricots	750000	3901256	19,22	846606	4083861	20,73	1,51
Cherries, sour	184167	1582391	11,64	182165	1411608	12,90	1,27
Tomatoes	12150000	179897928	6,75	12841990	180766329	7,10	0,35
Chillies and peppers, green	2554974	37341843	6,84	2625669	38027164	6,90	0,06
Watermelons	4031174	100458926	4,01	3870515	100414933	3,85	-0,16
Potatoes	4550000	365316462	1,25	4979824	370436581	1,34	0,10
Wheat	20000000	733386177	2,73	19000000	765769635	2,48	-0,25
Barley	7000000	139743307	5,01	7600000	158979610	4,78	-0,23
Maize	5700000	1124721882	0,51	6000000	1148487291	0,52	0,02
Beans, dry	220000	29969871	0,73	225000	28902672	0,78	0,04
Chick peas	630000	16135405	3,90	630000	14246295	4,42	0,52
Lentils	353000	6286722	5,62	353631	5734201	6,17	0,55
Oranges	1900000	75189362	2,53	1700000	78699604	2,16	-0,37
Lemons and limes	1100000	19582115	5,62	950000	20049630	4,74	-0,88
Apples	3625960	85823680	4,22	3618752	87236221	4,15	-0,08

Source: Compiled from FAODATABASE

In Table 1.11, we have presented information on the share of selected Turkish crop products in total world exports. Turkey's share in world hazelnut exports, which was 64.7% in 2018, increased by 3% and reached 67.7% in 2019. In addition, Turkey's share in world quinces export, which was %42.4 in 2018, decreased by %1.3 and occurred as %40.9 in 2019. When we examined other selected crop products, we observed Turkey's share of cherries, lemon and limes, chickpeas, lentils, and apricots in world exports in 2019 was around 10%. While the shares of Turkey's quinces, apricots, chilies and peppers, lemon and limes, lentils, oranges, and

potatoes export in world exports decreased between 2018-2019, we observed slight increases in other crop products we examined.

Table 1.11: The Share of Selected Turkish Crop Products in World Export

Products (Tonnes)	Turkey (2018)	World (2018)	Share (%)	Turkey (2019)	World (2019)	Share (%)	Change in Share (%)
Pistachios	4.777	376.618	1,268	15.951	456.543	3,494	2,23
Hazelnuts, shelled	161.327	249.331	64,704	193.007	284.982	67,726	3,02
Quinces	19.014	44.750	42,489	15.698	38.318	40,968	-1,52
Cherries	75.304	707.928	10,637	80.508	741.069	10,864	0,23
Apricots	70.698	467.816	15,112	67.631	493.672	13,700	-1,41
Tomatoes	525.874	8.353.569	6,295	531.243	7.855.182	6,763	0,47
Chillies and peppers, green	124.472	3.760.489	3,310	109.975	3.739.696	2,941	-0,37
Watermelons	57.500	4.096.197	1,404	63.265	4.286.828	1,476	0,07
Potatoes	261.561	13.639.958	1,918	185.002	14.757.315	1,254	-0,66
Wheat	69.998	190.902.446	0,037	135.157	180.170.956	0,075	0,04
Barley	15.610	36.543.786	0,043	41.188	31.100.157	0,132	0,09
Maize	65.802	173.679.931	0,038	691.567	184.709.704	0,374	0,34
Beans, dry	20.861	4.374.260	0,477	118.170	4.458.970	2,650	2,17
Chick peas	117.372	1.958.573	5,993	212.598	2.178.676	9,758	3,77
Lentils	298.560	3.149.980	9,478	308.545	3.910.839	7,889	-1,59
Oranges	449.763	7.496.605	6,000	238.679	7.833.034	3,047	-2,95
Lemons and limes	625.269	3.594.365	17,396	471.211	3.671.978	12,833	-4,56
Apples	238.330	8.357.385	2,852	257.471	8.776.214	2,934	0,08

Source: Compiled from FAODATABASE

1.5.1.2. The Use of Inputs in Crop Production in Turkey

“With the beginning of worldwide industrialization, the use of technology as input in agriculture increased after the 1950s. Meanwhile, Turkey also tried to adapt to these developments. Especially between 1970-1975, there was an increase in the number of tractors by nearly 100%.”²⁴ The list of some products used as inputs in agricultural production is given in Table 1.12. After 2003, the number of tools such as wooden plows and horse-drawn seed drills continued to decrease rapidly, while the number of tractors, trailers, and combine harvesters continued to increase. The increase in the number of trickle irrigation systems and deep well pumps indicates that modern irrigation systems are becoming widespread in Turkey. “With the rural development machinery and equipment support program, which started to be

²⁴ E. Rehber, and H. Vural, *op. cit.*, p. 84

implemented in 2007, a significant acceleration had been gained in the sector, especially after 2009.’’²⁵

Table 1.12: The Number of Selected Agricultural Tools and Machines in Turkey

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Tractor	997 620	1 009 065	1 022 365	1 037 383	1 056 128	1 070 746	1 073 538	1 096 683	1 125 001	1 178 253	1 213 560	1 243 300	1 260 358	1 273 531	1 306 736	1 332 139	1 354 912
Trailer	966 596	986 313	995 523	1 011 577	1 026 389	1 036 613	1 041 239	1 061 656	1 074 764	1 098 995	1 109 917	1 121 371	1 126 166	1 137 709	1 165 873	1 184 193	1 200 815
Combine harvester	11 721	11 519	11 811	12 359	12 775	13 084	13 360	13 799	14 313	14 813	15 486	15 899	15 998	16 247	17 199	17 266	17 190
Wooden plow	125 335	110 486	103 578	91 213	84 304	77 175	68 463	58 695	51 889	49 453	45 965	40 695	37 455	34 643	31 330	27 313	24 591
Horse-drawn seed drill	1 619	1 515	1 234	1 197	806	750	582	506	460	346	289	194	159	159	133	69	13
Trickle irrigation system	124 036	142 350	149 792	160 629	182 991	206 307	219 052	245 823	264 639	293 967	318 413	362 033	389 831	412 468	441 366	475 141	506 730
Deep-well pump	95 604	99 623	103 540	106 627	115 875	122 622	122 831	131 009	134 734	142 540	148 675	163 275	168 502	172 923	179 659	185 708	191 173

Source: Compiled from TURKSTAT, Agricultural Equipment and Machinery Statistics

In order to increase the yield and quality of agricultural products, it is necessary to use modern agricultural inputs such as chemical fertilizers and pesticides. These modern inputs are among the most important factors that reduce the dependence of agricultural production on natural conditions. In addition, the use of chemical fertilizers and pesticides is one of the most important indicators of agricultural development in the country. ‘‘In particular, the share of fertilizer use in the increase in crop production varies between 50-75%, and there is an important relationship between the increase in yield in crop production and fertilizer consumption.’’²⁶

Three types of fertilizers exist in the chemical fertilizers group. These are nitrogenous fertilizers, phosphorus fertilizers, and potash fertilizers. Among these chemical fertilizers, the most widely used both in World and in Turkey was nitrogenous fertilizers. In Table 1.13, we can see the types and amounts of fertilizers used in Turkey between 2009-2020. The usage of fertilizers, which were 10 million tons in 2009, increased to approximately 14.5 million tons in 2020. Turkey was

²⁵ E. Rehber, and H. Vural, *op. cit.*, p. 84

²⁶ H. Polat, The Status of Chemical Nitrogen Fertilizer Consumption in Turkey and The Necessity of Soil Analysis to the Use of Nitrogenous Fertilizers Evaluation of Effects, *Soil Water Journal*, 9(2), 2020, p. 61

almost catching the world average by 137.733 kg in fertilizer consumption, while the average world consumption was accounted for 138.156 kg in 2016.²⁷

Table 1.13: The Use of Chemical Fertilizers in Turkey

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fertilizer used (Tonnes)	10 278 731	9 592 752	9 074 308	10 148 982	11 415 756	10 694 543	10 777 779	13 925 448	13 089 074	10 567 457	12 167 571	14 495 815
Nitrogen (21% N)	6 730 852	6 397 089	5 995 500	6 817 217	7 542 247	7 107 106	7 077 214	9 028 793	8 401 087	7 272 531	8 010 324	9 774 691
Phosphorous (17% P ₂ O ₅)	3 416 978	3 028 666	2 882 296	3 129 299	3 662 099	3 353 104	3 437 368	4 660 032	4 438 096	3 063 902	3 924 247	4 491 994
Potash (50% K ₂ O)	130 901	166 997	196 512	202 466	211 410	234 333	263 197	236 623	249 891	231 024	233 000	229 130

Source: Compiled from TURKSTAT, Agricultural Fertilizer Statistics

Pesticide is one of the crucial tools used to protect agricultural products from the effects of diseases, pests, and weeds. Its implementation gained speed, especially after the 1940s, and became one of the most preferred efficiency-enhancing methods because it has a short response time and is easy to use. In cases where pesticides are not used, the quality and yield of agricultural products decrease up to 60%. For this reason, it is inevitable to use plant protection products in our country, as in all countries of the world, to control harmful organisms that cause crop loss.²⁸

Pesticides are classified according to the types of harmful insects. In the classification made according to the species, the three most significant big groups are insecticides, fungicides, and herbicides. Table 1.14 presents the distribution and amounts of pesticides used in Turkey by species. The year in which pesticides were used the most in Turkey was 2018. From 53 thousand tons of pesticide usage in 2020, 38% belongs to fungicides, 24.6% herbicides, and 23% insecticides. Turkey was almost catching the world average by 2.59 kg in pesticide consumption, while the average world consumption accounted for 2.66 kg in 2018.²⁹

²⁷ World Bank Database, Fertilizer Consumption, (Online Access), <https://data.worldbank.org/indicator/AG.CON.FERT.ZS>, 21.09.2021

²⁸ O. Tiryaki, R. Canhilal, and S. Horuz, Agrochemical Use and Its Risks, Erciyes University Institute of Science, **Journal of Science**, 26(2), 2010, p. 155

²⁹ FAODATABASE, Use of Pesticides, (Online Access), <https://www.fao.org/faostat/en/#data/RP>, 22.09.2021

Table 1.14: The Use of Pesticides in Turkey

Year	Insecticides (Tonnes)	Fungicides (Tonnes)	Herbicides (Tonnes)	Acaricides (Tonnes)	Rodenticides and Molluscicides (Tonnes)	Other (*) (Tonnes)	Total
2006	7 628	19 900	6 956	902	3	9 987	45 376
2007	21 046	16 707	6 669	966	51	3 277	48 716
2008	9 251	16 707	6 177	737	351	5 613	38 836
2009	9 914	17 863	5 961	1 533	78	2 302	37 651
2010	7 176	17 396	7 452	1 040	147	5 344	38 555
2011	6 120	17 546	7 407	1 062	421	6 978	39 534
2012	7 264	18 124	7 351	859	247	8 766	42 611
2013	7 741	16 248	7 336	858	129	7 128	39 440
2014	7 586	16 674	7 794	1 513	149	6 007	39 723
2015	8 117	15 984	7 825	1 576	197	5 327	39 026
2016	10 425	20 485	10 025	2 025	259	6 835	50 054
2017	11 436	22 006	11 759	2 452	236	6 209	54 098
2018	13 583	23 047	14 794	2 486	309	5 801	60 020
2019	11 609	19 698	12 644	2 124	264	4 958	51 297
2020	12 347	20 600	13 250	2 200	280	4 995	53 672
(*) Other include plant activator, plant growth regulator, insect attractant, fumigant and nematocide.							

Source: Compiled from TURKSTAT, Agricultural Pesticide Statistics

In 2009, Turkey's chemical fertilizer exports were 83.6 million dollars, and imports were 1.05 billion dollars. When the data for 2020 is examined, we can deduce the fact that exports increased to 375 million dollars and reached the highest value between 2009 and 2020, while imports were realized as 1.12 billion dollars. In 2020, the foreign trade deficit in chemical fertilizers was 753.4 million dollars, and Turkey was a net importer of chemical fertilizers between 2009-2020.³⁰

In 2009, Turkey's pesticide exports were 56.7 million dollars, and imports were 208.5 million dollars. Afterward, exports increased to 104.1 million dollars in 2018, 150.1 million dollars in 2019, and 375.5 million dollars in 2020. The import of pesticides was 208 million dollars in 2009 and have reached 463 million dollars in 2020. Turkey is a net importer of pesticides between 2009-2020. However, it is noteworthy that the foreign trade deficit in pesticides has decreased in recent years.

³⁰ International Trade Center Database, Trade Map, HS Code 31, (Online Access), <https://www.intracen.org/itc/market-info-tools/statistics-export-product-country/>, 17.10.2021

The foreign trade deficit in pesticides, which was 361.4 million dollars in 2018, diminished to 252 million dollars in 2019 and 87.4 million dollars in 2020.³¹

“The seed is the first link of the food chain and the basis of biological and cultural diversity. Certified seeds can be defined as a strategically important crop production input for the countries. In addition, it is a product that can be deduced by using high technology so that granting high profits. Scientific research has indicated that the share of certified seeds in the yield of products is 20-30% in cereals and dry pulses and over 100% in corn and sunflower.”³²

The seed production in Turkey is carried out by the public and private sectors. State-run seed companies within Turkey's seed supply system were engaged in a limited production and distribution activity focused on wheat, barley, and some forage crops. Seed production, which was initially carried out as a task given to the public sector, has gained a competitive identity, including the private sector, with the government policies implemented after the 1980s in Turkey. As a result of the liberalization of the economy and the removal of the restrictions on foreign trade of seeds, investments in the seed sector started to increase, and many domestic or foreign seed companies entered the seed sector either directly or through partnerships. After all these developments, the number, capacity, and activities of private seed companies in Turkey started to increase rapidly in a short time. There are 754 seed companies authorized by the Ministry of Agriculture and Forestry in Turkey as of 2020.³³

Table 1.15 presents certified seed production, domestic use, and self-sufficiency rates in Turkey in 2002, 2018, and 2019. Corn and sunflower were the most exported seeds in 2019. Wheat seed production, which was 80 thousand tons in 2002, increased to 1.3 million tons in 2019. Barley seed production, which was 4

³¹ International Trade Center Database, Trade Map, HS Code 3808, (Online Access), <https://www.intracen.org/itc/market-info-tools/statistics-export-product-country/>, 17.10.2021

³² Turkish General Directorate of Agricultural Enterprises, Seed Industry Report, 2019, p. 4, (Online Access), <https://www.tigem.gov.tr/WebUserFile/DosyaGaleri/2018/2/a374cc25-acc1-44e8-a546-63b4c8bce146/dosya/2019%20YILI%20TOHUMCULUK%20SEKTOR%20RAPORU.pdf>, 22.09.2021

³³ *Ibid.*, p. 5

thousand tons in 2002, increased to 177 thousand tons in 2019. In 2019, sugar beet seed production started to fail to meet domestic consumption. Finally, the increase in chickpea, dry bean, and lentil seed production draws attention.

Table 1.15: Certified Seed Production and Self-sufficiency Rates in Turkey

Species	2002			2018			2019		
	Production (Tonnes)	Domestic Use (Tonnes)	Self-sufficiency rate (%)	Production (Tonnes)	Domestic Use (Tonnes)	Self-sufficiency rate (%)	Production (Tonnes)	Domestic Use (Tonnes)	Self-sufficiency rate (%)
Wheat	80.107	1.620.000	4,9	426.658	1.459.854	29,2	483.957	1.369.265	35,3
Barley	4.376	602.001	0,7	151.365	522.388	29	177.306	573.814	30,9
Paddy	1.293	20.025	6,5	10.565	21.028	50,2	9.886	25.284	39,1
Maize	15.896	11.840	134,3	62.230	17.757	350,5	44.889	19.165	234,2
Sunflower	4.575	2.336	195,8	25.028	2.938	851,9	28.602	3.011	949,9
Soybean	595	947	62,8	3.230	2.956	109,3	3.960	3.177	124,6
Sugar beet	1.421	1.298	109,5	1.818	1.229	147,9	1.159	1.240	93,5
Chickpea	198	45.594	0,4	31.990	51.442	62,2	35.643	52.060	68,5
Dry bean	29	9.492	0,3	1.032	8.480	12,2	3.925	8.894	44,1
Lentil	25	18.939	0,1	22.011	27.723	79,4	35.670	28.239	126,3
Potato	21.375	434.456	4,9	276.390	407.812	67,8	255.966	422.690	60,6

Source: Compiled from Republic of Turkey Ministry of Agriculture and Forestry

Table 1.16 presents the seed import and export data of Turkey. According to 2019 data, Turkey is in the position of importing country in seeds. However, the developments in the sector from 2002 to 2019 were positive. While Turkey's seed import value was 55.3 million dollars in 2002, it increased by 221% and reached 177.3 million dollars in 2019. On the other hand, while seed export was 17.3 million dollars in 2002, it increased by 798% and reached 155.4 million dollars in 2019. In addition, the ratio of Turkey's seed exports to imports was 31% in 2002, and then this ratio increased to 88% in 2019. These developments in foreign trade of seeds between 2002 and 2019 indicated that exports tend to rise more than imports.

Table 1.16: Seed Import and Export Values in Turkey (Thousand US \$)

Year	2002	2012	2016	2017	2018	2019
Import	55,292	197,648	202,127	189,002	178,854	177,333
Export	17,32	120,796	153,449	137,077	151,693	155,427
Difference	37,972	76,852	48,678	51,925	27,161	21,906
Ratio of exports to imports	31	61	76	73	85	88

Source: Compiled from Republic of Turkey Ministry of Agriculture and Forestry

Turkey's Sugar Production

There are two types of sugar widespread in the world. One is sucrose-based sugar, and the other is starch-based sugar. Sugar production based on sucrose is produced from sugar cane and sugar beet. On the other hand, starch-based sugar is produced from agricultural products such as corn, wheat, and potatoes. However, among the agricultural products that can be used in sugar production, the most preferred product by enterprises is corn. High fructose corn syrup is used as an alternative to sugar obtained from beets, as it is cheaper and much sweeter.

In Turkey, the Sugar Law was enacted with the imposition of the International Monetary Fund and the World Bank. With this law, sugar beet production was tied to a quota. Besides, a quota was introduced for starch-based sugar. These quotas are divided into three groups as A, B, and C. According to the Sugar Law, the starch-based sugar quota cannot exceed 10 percent of the A quota of sugar obtained from beets. Besides, according to the Sugar Law, the starch-based sugar quota, which is 10 percent, can be increased by 50 percent or reduced by 50 percent by the decision of the Council of Ministers. After the quota was implemented, the coalition government of that period and then the Justice and Development Party government used this authority to increase the quota by 50 percent. In other words, the starch-based sugar quota was applied as 15 percent for a long time. Later, in 2018, when sugar factories were privatized in Turkey, the starch-based sugar quota was reduced to 5 percent with Law No. 7103, which was published in the Official Newspaper on March 27, 2018.

After the transition to the Presidential Government System in Turkey, the authority to increase or decrease the starch-based sugar quota by 50 percent was taken from the Council of Ministers and given to the President. President Recep Tayyip Erdoğan has been using his quota authority for the last three years to reduce it

by 50 percent. For this reason, the starch-based sugar quota, which is 5 percent according to the law, is applied as 2.5 percent.³⁴

However, in Turkey, there are companies that only produce for export outside the scope of the quota. When we examined the data of the Ministry of Agriculture and Forestry, we observed that the total starch-based sugar production, which was 483 thousand tons in 2011, increased to 634 thousand tons in 2016. After 2016, the total starch-based sugar production decreased to 488 thousand tons in 2019. Of the 488 thousand tons of production in 2019, 67.5 thousand tons were the products made within the scope of the quota. The increase in Turkey's certified corn seed production is also directly related to corn syrup production. Turkey's corn production is at the level of 6.5 million tons, while corn consumption is over 8 million tons. As long as domestic production in our country does not meet the need, corn import will continue.³⁵

1.5.1.3. The Recent Developments in Crop Production

In recent years, the epidemic, climate change, and the depreciation of the Turkish Lira have negatively affected the agricultural sector in our country. Due to Turkey's foreign dependency on many agricultural inputs such as diesel oil, fertilizers, pesticides, and seeds, the depreciation in TL is reflected as an increase in the prices of agricultural inputs. Besides, the import-export imbalances due to the Covid-19 pandemic cause the fluctuations in the prices of imported agricultural inputs to increase. In particular, this increase in production costs has made it difficult for producers in Turkey to access modern agricultural inputs in recent years. In this context, there has been a significant decrease in the use of fertilizers after 2016 and pesticides after 2018 in Turkey. It should not be forgotten that the decreases in the

³⁴ A. E. Yıldırım, 20 Years of Applications of Starch-based Sugar Quota, Agricultural World Food, Agriculture and Livestock Platform , 2021, (Online Access), <https://www.tarimdunyasi.net/2021/06/09/nisasta-bazli-seker-kotasinin-20-yillik-uygulamalari/>, 13.02.2022

³⁵ Turkish Republic Ministry of Agriculture and Forestry, Sugar Department, Turkish Sugar Industry, 2021, (Online Access), <https://www.tarimorman.gov.tr/SDB/Belgeler/sektorel%20veriler/Türkiye%20Şeker%20Sektörü%20Web%20İçin%20-%20007022022.pdf>, 14.02.2022

use of technological agricultural inputs directly affect the productivity level in crop production. Besides all this, the government tries to reduce the price level of products by importing agricultural products with high price increases. As a result of the imports, although the domestic prices tend to decrease in the short term, the real incomes of the producers start to diminish. Consequently, it becomes hard to ensure sustainability in production for producers whose incomes tend to decrease.

In addition to the increase in the prices of agricultural inputs and the unfavorable effects caused by import policies to domestic producers, natural disasters such as extreme heat, frost, flood, and drought have increased their impact on our country in recent years. The increase in the severity of drought, floods, forest fires, and the water problem caused by the change in the precipitation regime affected crop production in 2021 more than in the previous years. In 2021, while agricultural production was suffered due to drought in the Southeast, Eastern Anatolia, and Central Anatolia Regions, forest fires occurred in the Aegean and Mediterranean Regions, and flood disasters in the Black Sea Region. Undoubtedly, the sector most affected by these disasters in Turkey was the agricultural sector. In particular, product losses occurred in crop production due to natural disasters. In this context, the decrease in crop production leads to an increase in product prices and the variety of imported products. As a result, these unfavorable developments cause some producers to continue production by borrowing or risking financial losses, while smaller producers stop their production because they cannot reach the necessary inputs.

According to the data reported by TURKSTAT, the total cultivated land for cereal products in Turkey has been decreasing since 2014. The cultivated land, which was 11.6 million hectares in 2014, decreased by 8.3% to 10.6 million hectares in 2019.³⁶ In addition to cereals, we observed a similar situation in the production of dry pulses. In our country, the desired success could not be achieved in the production of dry pulses, which were included in the scope of the government's premium support in 2009. The main reasons behind this failure were the high input

³⁶ TURKSTAT, Crop Production Statistics, 2021

costs and the inadequacy of the support provided by the government. Besides, Turkey's foreign dependency on the seed of dry pulses is one of the main factors in the increasing input costs. For the first time in 2008, 0.09 TL per kg was given to chickpeas, lentils, and beans within the scope of premium support. The following year, the support increased to 0.10 TL per kg. After 2009, although the production areas and production quantity decreased, the support price remained at the same amount until 2015. In 2015, the support given to dry pulses was increased by 100% to 0.20 TL per kg. In addition to all these, one of the main reasons why our farmers gave up on dry pulses production was the termination of the ‘‘Narrowing Fallow Fields Project’’ in 1994. Although the Ministry of Agriculture and Forestry started a new practice in 2018 to bring fallow lands into agricultural production, this project covers a small scale of 50 thousand decares. The amount of fallow land in Turkey corresponds to one-fourth of the total cultivated land and five times the cultivation area of dry pulses. It is stated by many authors that if this project is expanded so that only one-fifth of the existing fallow lands will be cultivated, it will make a significant contribution to the solution of Turkey's pulses production problem.³⁷

According to the latest data reported by TURSTAT, crop production decreased by 13.4% in cereals and other crop products in 2021 compared to the previous year. On the other hand, it increased by 1.8% in vegetables and 5.4% in fruits, beverage, and spice crops. Accordingly, the production amounts in 2021 were approximately 61.7 million tons in cereals and other crop products, 31.8 million tons in vegetables, and 24.9 million tons in fruits, beverage, and spice crops. When we examine the data for 2021, we can say that all unfavorable developments that occurred in 2021 affect cereal products and dry pulses more than other crop products.³⁸

³⁷ A. E. Yıldırım, 8 Suggestions to End the Import of Dry Pulses, Agricultural World Food, Agriculture and Livestock Platform, 2019, (Online Access), <https://www.tarimdunyasi.net/2019/03/29/bakliyata-ithalati-bitirecek-8-oneri/>, 14.02.2022

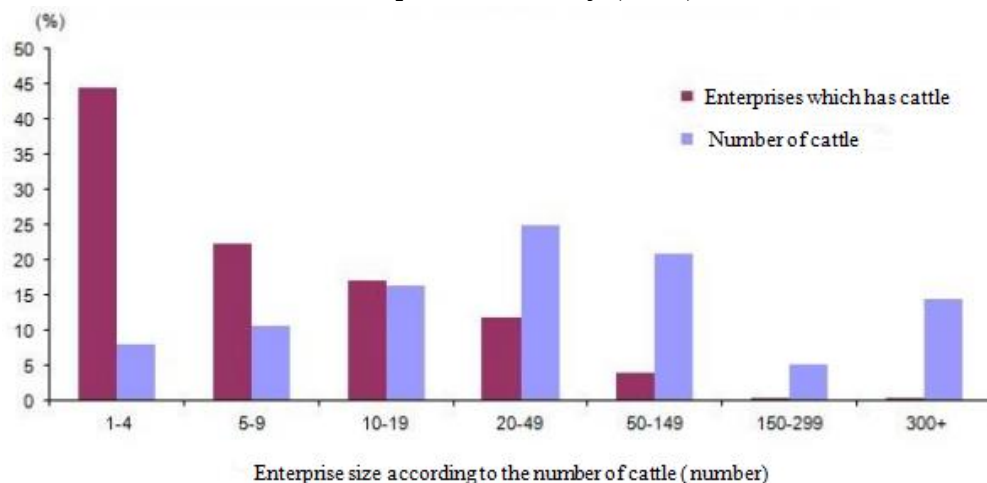
³⁸ TURKSTAT, Crop Production Statistics, 2021

1.5.2. Animal Production in Turkey

The production of live animals and all products obtained from live animals constitute animal production. Animal production is handled under four main headings as cattle farming, sheep and goat farming, poultry farming, and beekeeping. Most of the income from animal production is obtained from red meat, milk, chicken meat, and egg production. In this part of the study, we will examine the number of live animals, the number of animal products produced, the shares of different animal species in meat and milk production in Turkey between 2001-2019.

Graph 1.5 presents the distribution of enterprises and cattle according to the size of enterprises in Turkey. When the farm size group of agricultural enterprises with cattle and buffalos is analyzed, we observe that the number of farms is concentrated in the size group with 1-4 animals at 44.5%. On the other hand, the number of cattle and buffalos became dense in the farm size group with 20-49 heads at 24.8%.

Graph 1.5: The Distribution of Enterprises and Cattle According to the Size of Enterprises in Turkey (2006)

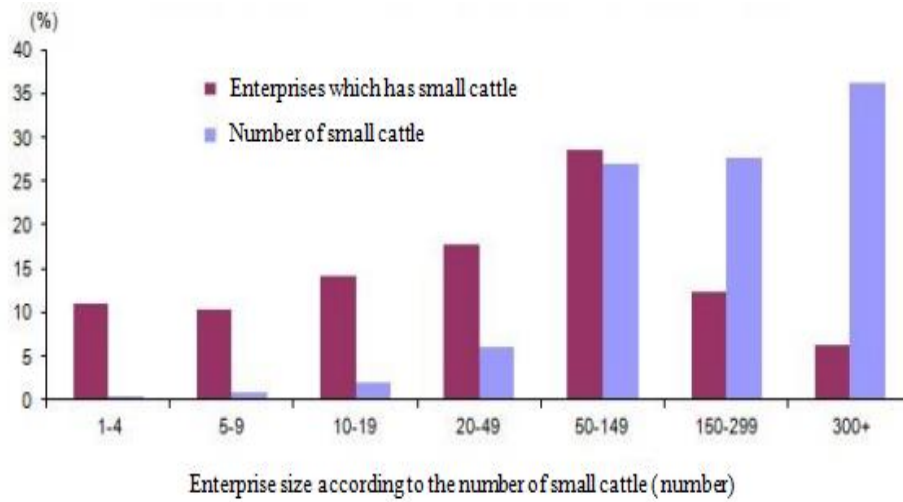


Source: TURKSTAT, Agricultural Enterprise Structure Research 2016, 2018

Graph 1.6 presents the distribution of enterprises and small Cattle according to the size of the enterprise in Turkey. When the farm size group of agricultural enterprises with sheep and goats is analyzed, we observe that the number of farms is concentrated in the size group with 50-149 animals at 28.5%. On the other hand, the

number of sheep and goats became dense in the farm size group with 300 or more heads at 36.3%.

Graph 1.6: The Distribution of Enterprises and Small Cattle According to the Size of Enterprises in Turkey (2016)



Source: TURKSTAT, Agricultural Enterprise Structure Research 2016, 2018

1.5.2.1. The Analysis of the Number of Animals and the Amount of Animal Products in Turkey

When we examined Table 1.17 and Table 1.18, we observed that animal products increased in parallel with the number of live animals between 2001-2019. During this period, meat production tripled, chicken meat production nearly quadrupled, milk and egg production doubled. In the 2001-2009 period, the amount of meat production remained at the same level due to the lack of development in animal production. While the amount of red meat production was at the same level in this period, the inability of red meat production to meet the increasing demand caused an upward trend in meat prices after 2008. In addition, consumers who lost their access to red meat turned to chicken meat, and chicken meat production, which had an increasing trend between 2001 and 2007, has gained significant momentum since 2008. In order to reduce the rising meat prices in 2010, the Turkish Government started the import process in livestock. In this context, imports of cattle, sheep, lamb, and finally carcass meat were started in Turkey to be used for different purposes. Customs duties in livestock imports were reduced to 0% and carcass meat

to 30%, creating investment opportunities for the private sector. With all these developments, the livestock sector started to turn into a foreign-dependent structure after 2010. In addition to all this import process, the Turkish Government, through the Ziraat Bank, implemented 0% interest on investments in the livestock sector, enabling many new investors to enter the livestock sector. As a result of these developments, especially after 2009, the number of animals and animal products produced continued to increase until today. Although all these initiatives managed to keep meat prices in the balance until 2013, the increase in meat prices continued to gain momentum after 2014.³⁹

Table 1.17: The Number of Animals by Type in Turkey (2001-2019)

Year	Cattle	Sheep	Goats	Total	Poultry animals
2001	10 548 000	26 972 000	7 022 000	44 542 000	223 140 520
2002	9 803 498	25 173 706	6 780 094	41 757 298	251 100 960
2003	9 788 102	25 431 539	6 771 675	41 991 316	283 674 375
2004	10 069 346	25 201 155	6 609 937	41 880 438	302 799 485
2005	10 526 440	25 304 325	6 517 464	42 348 229	327 917 205
2006	10 871 364	25 616 912	6 643 294	43 131 570	349 402 115
2007	11 036 753	25 462 293	6 286 358	42 785 404	273 548 490
2008	10 859 942	23 974 591	5 593 561	40 428 094	249 043 740
2009	10 723 958	21 749 508	5 128 285	37 601 751	234 082 205
2010	11 369 800	23 089 691	6 293 233	40 752 724	238 972 960
2011	12 386 337	25 031 565	7 277 953	44 695 855	241 498 540
2012	13 914 912	27 425 233	8 357 286	49 697 431	257 505 340
2013	14 415 257	29 284 247	9 225 548	52 925 052	270 202 035
2014	14 223 109	31 140 244	10 344 936	55 708 289	298 029 735
2015	13 994 071	31 507 934	10 416 166	55 918 171	316 332 445
2016	14 080 155	30 983 933	10 345 299	55 409 387	333 541 260
2017	15 943 586	33 677 636	10 634 672	60 255 894	348 143 755
2018	17 042 506	35 194 972	10 922 427	63 159 905	359 217 860
2019	17 688 139	37 276 050	11 205 429	66 169 618	348 784 885

Source: Compiled from TURKSAT, Animal Production Statistics

³⁹ TURKSTAT, Livestock and Animal Production Values

Table 1.18: The Quantity of Animal Products in Turkey (2001-2019)

Year	Meat (Tons)	Milk (Tons)	Chicken meat (Tons)	Hen eggs (Thousand)	Honey (Tons)	Silk worm cocoon (Tons)	Wool (Tons)	Hair (Tons)	Mohair (Tons)
2001	435 778	9 495 550	614 745	10 575 046	60 190	47	40 909	2 684	400
2002	420 595	8 408 568	696 187	11 554 910	74 554	100	38 244	2 589	318
2003	366 962	10 611 011	872 419	12 666 782	69 540	169	46 456	2 741	333
2004	447 154	10 679 406	876 774	11 055 557	73 929	143	45 972	2 716	304
2005	409 423	11 107 897	936 697	12 052 455	82 336	157	46 176	2 654	302
2006	438 530	11 952 099	917 659	11 733 572	83 842	127	46 776	2 728	274
2007	575 622	12 329 789	1 068 454	12 724 959	73 935	125	46 752	2 536	237
2008	482 458	12 243 040	1 087 682	13 190 696	81 364	125	44 166	2 238	194
2009	412 621	12 542 186	1 293 315	13 832 726	82 003	136	40 270	2 002	174
2010	780 718	13 543 674	1 444 059	11 840 396	81 115	126	42 823	2 607	200
2011	776 915	15 056 211	1 613 309	12 954 686	94 245	151	46 586	3 062	194
2012	915 844	17 401 262	1 723 919	14 910 774	89 162	134	51 180	3 570	200
2013	996 125	18 223 713	1 758 363	16 496 751	94 694	121	54 784	4 902	260
2014	1 008 272	18 630 859	1 894 669	17 145 389	103 525	80	58 402	5 460	280
2015	1 149 262	18 654 682	1 909 276	16 727 510	108 128	115	59 196	5 569	325
2016	1 173 042	18 489 161	1 879 018	18 097 605	105 727	103	58 168	5 518	340
2017	1 126 403	20 699 893	2 136 734	19 281 196	114 471	102	63 315	5 797	356
2018	1 118 695	22 120 716	2 156 671	19 643 711	107 920	94	66 428	5 999	371
2019	1 201 469	22 960 379	2 138 451	19 898 126	109 330	90	70 588	6 162	380

Source: Compiled from TURKSAT, Animal Production Statistics

Table 1.19: The Share of Species in Turkish Meat Production (%)

Year	Total Meat Production (Tons)	Share of Species in Total Meat Production(%)					
		Cattle	Sheep	Goats	Buffaloes	Camel	Pig
2001	435 778	76,091	19,66	3,7	0,526644	0,0021	0,0197
2005	409 423	78,569	18,01	3,03	0,385176	0,0044	0,0034
2009	412 621	78,834	18,09	2,83	0,243565	0,0044	0,0008
2013	996 125	87,267	10,33	2,36	0,033731	-	-
2016	1 173 042	90,295	7,032	2,64	0,029939	-	-
2019	1 201 469	89,514	9,104	1,38	0,006045	-	-

Source: Authors' Calculations⁴⁰

In order to examine the structure of animal production in Turkey in more detail, Table 1.19 and Table 1.20 presents the shares of different types of animals in meat and milk production. According to these data, 90% of Turkey's total red meat

⁴⁰ Based on the data of TURKSAT, Animal Production Statistics

and milk production in 2019 was provided from cattle, while 9% was from small cattle (sheep and goats). According to data between 2001 and 2019, we observed that the share of cattle increased from 76% to 90% in red meat production, while the share of small cattle decreased from 23% to 10%. Besides, in total milk production, cattle, which realized 89.4% of the milk production in 2001, remained at the level of 90% by showing minor changes until 2019.

Table 1.20: The Share of Species in Turkish Milk Production (%)

Year	Total Milk Production (Tons)	Share of Species in Total Milk Production(%)			
		Cattle	Sheep	Goats	Buffaloes
2001	9 495 550	89,4	7,618	2,31472	0,6669124
2005	11 107 897	90,26	7,111	2,28449	0,3426211
2009	12 542 186	92,35	5,854	1,53251	0,258679
2013	18 223 713	91,39	6,042	2,28134	0,2850517
2016	18 489 161	90,79	6,276	2,59287	0,3411999
2019	22 960 379	90,51	6,626	2,51393	0,3455561

Source: Authors' Calculations⁴¹

Turkey's small cattle stock began to decline after 1990. This decrease continued until 2010. The main reasons for this decrease in the presence of small cattle can be listed as:

- low productivity levels due to genetic and environmental causes,
- insufficient use of new production techniques,
- within the supports provided to the livestock sector, the share allocated for sheep and goats is less than for cattle,
- terrorist activities in the Southeast and East Anatolian Regions.⁴²

After the import policies that started in 2010, Turkey's sheep and goat presence began to increase, and today it has returned to its level in the 1990s. However, although Turkey's sheep and goat presence increased after 2010, the share of meat and milk supplied from sheep and goats in total production continued to

⁴¹ Based on the data of TURKSAT, Animal Production Statistics

⁴² Ed. by B. Pakdemirli, **et. al.**, **Agricultural Policies and Economics**, Akçay Publications, 1st Edition, 2019, pp. 299-300

decrease. The main reasons for this decrease in the share in production can be listed as:

- a) insufficient production of high-quality roughage and misuse of pasture lands,
- b) the associations established by small cattle producers are not at a level to educate members, raise awareness, and voice the problems of the sector,
- c) small and scattered structure of enterprises,
- d) absence of a qualified and sufficient number of animal keepers.⁴³

Table 1.21: The Values of Livestock in Turkey (2019-2020)

Livestock(1)	Value (TL)			
	2019	Share (%)	2020	Share (%)
Total	165 318 007 057	100	195 238 955 231	100
Sheep	37 246 653 540	22,53	49 664 710 995	25,44
Ordinary goats	9 081 846 339	5,49	10 826 811 503	5,55
Angora goats	152 141 606	0,09	177 217 487	0,09
Cattle	112 113 063 068	67,82	124 655 094 596	63,85
Buffaloes	751 354 269	0,45	935 700 617	0,48
Horses	18 109 756	0,01	75 026 225	0,04
Mules	19 596 839	0,01	29 120 961	0,01
Asses	26 897 115	0,02	37 788 997	0,02
Camels	1 690 120	0,00	3 039 541	0,00
Hens	5 518 118 874	3,34	8 297 661 022	4,25
Turkeys	258 454 353	0,16	356 231 883	0,18
Ducks	9 504 934	0,01	14 061 828	0,01
Geese	120 576 243	0,07	166 489 576	0,09
(1) CPA 2002/2008 Classification				

Source: Compiled from TURKSTAT, Animal Production Statistics

Table 1.21 and Table 1.22 present the monetary values of live animals and animal products in 2019 and 2020. According to these data, the value of livestock, which was 165.3 billion TL in 2019, increased by 18.10% and reached 195.2 billion TL in 2020. Besides, in 2020, 63.85% of the monetary value of livestock consisted of cattle, 25.4% of sheep, 5.64% of goats, and 4.25% of poultry. 0.86% of the remaining value was distributed among other animals.

⁴³ Ed. by B. Pakdemirli, et. al., **op. cit.**, pp. 311-314

In 2020, the monetary value of cattle increased by 11.28% and reached 125.59 billion TL, while the value of small cattle increased by 30.52% to 60.67 billion TL. In addition, in 2020, the monetary value of poultry increased by 49.57% compared to the previous year and reached 8.83 billion TL.⁴⁴

The monetary value of animal products, which was 93.9 billion TL in 2019, increased by 15.63% and reached 108.6 billion TL in 2020. Besides, in 2020, 50.90% of the monetary value of animal products consisted of milk, 37.49% meat, 6.91% egg, 4.27% honey. Finally, the remaining 0.43% was distributed among other animal products.

Table 1.22: The Values of Animal Products in Turkey (2019-2020)

Animal products(1)	Value (TL)			
	2019	Share (%)	2020	Share (%)
Total	93 917 545 186	100,0	108 598 173 132	100
Milk	43 653 814 412	46,48	55 277 965 529	50,90
Meat	38 140 558 877	40,61	40 715 924 030	37,49
Hide	241 266 100	0,26	209 540 344	0,19
Wool	124 943 693	0,13	119 591 130	0,11
Hair	7 006 263	0,01	5 481 559	0,01
Mohair	6 284 265	0,01	9 427 556	0,01
Hen eggs	7 350 229 745	7,83	7 506 945 377	6,91
Honey	4 274 112 819	4,55	4 640 896 706	4,27
Wax	116 401 628	0,12	108 310 256	0,10
Silk cocoons	2 927 383	0,00	4 090 643	0,00
(1) CPA 2002/2008 Classification				

Source: Compiled from TURKSTAT, Animal Production Statistics

In 2020, compared to the previous year, the total milk production value increased by 26.63% and reached 55.28 billion TL, the total red meat production value increased by 6.75% and became 40.72 billion TL, and the honey production value increased by 8.58% and reached 4.64 billion TL. Besides, in 2020, the egg production value increased by 2.13% compared to the previous year and reached 7.51 billion TL. Between 2019-2020 there was an increase of 20.30% in the price of sheep milk and 25.20% in the price of goat milk. Besides that, the products that showed the fewest increase between 2019-2020 were beeswax with 2.83% and eggs

⁴⁴ TURKSTAT, Livestock and Animal Production Values, 2020

with 3.48%, respectively. On the other hand, the only product that showed a decrease compared to the previous year was fleece (hair clipped from sheep) with 4.43%.⁴⁵

1.5.2.2. The Recent Developments in Animal Production

In addition to the pandemic and climate change that has increased its impact in Turkey in recent years, the unfavorable effects of the depreciation of the Turkish Lira also significantly affect the livestock sector. When we examine the general structure of the livestock sector in Turkey, it is evident that the policies based on imports that started in 2010 continue today. In addition to Turkey's livestock imports, more than half of the raw materials used in the production of animal feeds such as soy and corn are also imported. In addition to all these, other products imported by Turkey for the livestock sector can be listed as (1) roughage such as straw and clover, (2) vaccines, (3) machinery and equipment, and (4) animal caretakers.

According to the data of the Turkish Feed Industrialists' Association, while the ton price of feed used to feed poultry was 1793 TL in 2018, it increased to 3720 TL in March 2021. In addition, the increase in the last year was 54.36 percent. In the same period, the ton price of feed used to feed milk cows was increased from 1266 TL to 2310 TL. The rate of increase in the last year was 48.08%. Lastly, the feed used for fatlings increased from 1148 TL to 2100 TL per ton in this period. From March 2020 to March 2021, the price increase was 43.84 percent.⁴⁶

After the recent unfavorable developments such as pandemics and droughts throughout the country, increases in fertilizer, diesel, and energy prices for agricultural producers, and increases in the price of animal feed, which is the most significant input for the livestock sector, started to threaten sustainable production. Besides, increases in the prices of animal products such as meat, milk, and eggs lag behind the increases in input prices. In addition to all these, the decline in production levels of cereals due to drought and increased input costs directly affects domestic feed production. In this context, due to the increase in input prices, the decrease in the production levels of forage crops, and Turkey's foreign dependency on raw

⁴⁵ TURKSTAT, Livestock and Animal Production Values, 2020

⁴⁶ Turkish Feed Manufacturers Association, Feed Industry Statistics, 2021

materials which is used for the production of animal feeds, we expect that the prices of animal feeds will continue to increase in the coming years. In general, these increases in input costs make it difficult for enterprises that cannot produce their own animal feed to keep their production levels at the same level in the coming years.

The main reason for the roughage problem in our country is the inefficient or non-purpose use of pasture lands. In this context, Muş Alparslan University Faculty of Applied Sciences organized an important workshop called "The Problems of Roughage in the Livestock Sector in Turkey and Solutions" on 21-22 June 2021 to address the problems experienced in roughage and their solutions. As a result of this workshop, attention was drawn to the illegal constructions in the pasture lands in our country, in other words, the non-purpose use of the pasture lands. Among the solutions offered by the workshop regarding this problem, other notable titles can be listed as:

- a) receiving grazing fees from animal owners who use pastures to ensure sustainable use,
- b) increasing efficiency in the use and improvement of forest and under-forest pastures by cooperating with the forestry organization,
- c) encouraging the cultivation of forage plant species with high grass yield in order to close the quality roughage deficit in our country,
- d) giving priority to large-scale and farm-based projects that will transform straw into more valuable feed by processing with different methods,
- e) encouraging the cultivation of forage crops species and varieties that are resistant to heat and drought, taking into account global warming and climate changes.⁴⁷

Survival of the livestock sector and solving the problems in red meat production are only possible if milk has a stable and secure market. The main purpose of the dairy farms in our country is to maximize profits by increasing milk production. Therefore, profitability is evaluated entirely on milk price and animal

⁴⁷ E. Açıkgöz, **et. al.**, The Problems of Roughage in the Livestock Sector in Turkey and Solutions Workshop Final Report, Muş Alparslan University, 2021, (Online Access), <https://www.alparslan.edu.tr/documents/16321262870.pdf> , 02.02.2022

feed costs, and calf and breeder production is always ignored. In this context, the basis of meeting Turkey's livestock needs by importing them instead of domestic production lies in this problem. Apart from increasing input costs and other issues experienced in sustainable production, one of the substantial issues to be considered is the efficiency level. According to data reported by EUROSTAT in 2018, Turkey ranks first in Europe in the presence of small cattle and dairy cattle. In terms of cattle, it ranks second after France. Turkey is also the leader in Europe and the second in the world in cattle import. According to Eurostat 2018 data, while France has 3.5 million dairy cows, Turkey has 5.9 million dairy cows. While France can produce 24.6 million tons of milk from 3.5 million dairy cows, Turkey can produce 18.7 million tons of milk from 5.9 million dairy cows. Germany, whose dairy cows are less than us, produced 31.9 million tons of milk from 4.2 million dairy cows. According to these data, we can say that Turkey did not perform well in terms of efficiency in milk production.⁴⁸

The most important reason for the productivity problem in milk production is the mistakes made in the feeding of dairy cows. In our country, feeding programs based on milk yield cause cows to experience reproductive problems after a certain period of time. In other words, this profitability-oriented perspective causes the calf productivity to be ignored. The enterprises cannot get the expected yield from the dairy cattle they buy from domestic or foreign sources with the expectation of a high milk yield. Unfortunately, dairy cows that become sterile after a certain period of time are evaluated for meat purposes. As a result, this problem causes damage to enterprises, waste of resources, and loss of national wealth for our country in general.⁴⁹

⁴⁸ A. E. Yıldırım, **Don't Produce, Consume: Agriculture in the Clamp of Import-Politics-Rent**, Sia, 5th Edition, 2019, pp. 145-146

⁴⁹ A. E. Yıldırım, Dairy Cattle; Our Investment and Management Approach, Agricultural World Food, Agriculture and Livestock Platform, 2021, (Online Access), <https://www.tarimdunyasi.net/2021/06/03/ulkemiz-sut-sigirciligi-yatirim-ve-isletmecilik-anlayisimiz/>, 14.02.2022

1.5.3. Fishery in Turkey

Today, especially in developed countries, people pay great attention to their nutrition and are taking care to choose foods suitable for health in their eating habits. From that point of view, the fish plays a crucial role with its rich protein content and polyunsaturated fatty acids in its structure. It meets the body's basic nutritional needs and is among the most important nutrients in maintaining a healthy life with its positive effect on human physiology and metabolic functions.⁵⁰ In the report published by the OECD in 2016, it was noted that aquaculture production showed the fastest growth in the production of food and agricultural products. Likewise, in the 2018 report published by FAO, it was announced that the sector that has shown the most development in the agricultural sector in recent years is the aquaculture sector.⁵¹

As in the whole world, likewise in Turkey, fishing is divided into two activity groups as hunting and aquaculture. One of the interesting features of Turkey's marine ecosystem is embodied in the fact that as we are traveling from north to south, the number of species, temperature, and salinity increases. On the contrary, the fish population decreases in the same direction. In Turkey, about 200 natural lakes, more than 300 dam lakes, 33 large streams, and 750 ponds constitute inland waters that are important for aquaculture production.⁵²

In 2018, 178 million tons of fishery products were produced in the world. Out of this, approximately 96 million tons of products were obtained through hunting, while 82 million tons were obtained through aquaculture. While 156 million tons of this production amount is used directly for food supply, the remaining 22 million tons are used in the production of non-food products, especially fish flour and fish oil

⁵⁰ Y. Kaya, H. A. Duyar, and M. E. Erdem, The Importance of Fish Fatty Acids for Human Health, **E.U. Journal of Fisheries and Aquatic Sciences**, 21(3-4), 2004, p. 366

⁵¹ T. F. Çötel, Fisheries Report, Republic of Turkey Ministry of Agriculture and Forestry Institute of Agricultural Economics and Policy Development, 2020, p. 1, (Online Access), <https://arastirma.tarimorman.gov.tr/tepge/Belgeler/PDF%20Ürün%20Raporları/2020%20Ürün%20Raporları/Su%20Ürünleri%20Ürün%20Raporu%202020-317%20TEPGE.pdf>, 24.09.2021

⁵² Union of Chambers of Turkish Engineers and Architects, Chamber of Agricultural Engineers, Fisheries Report, 2017, (Online Access), https://www.zmo.org.tr/genel/bizden_detay.php?kod=27302&sube=0, 26.09.2021

production. By observing the world data, it has been determined that 17% of people's animal protein needs were met from fish in 2017, and this figure corresponded to 7% of all consumed protein.⁵³

Table 1.23 and Table 1.24 present Turkey's production, export, import, and consumption of fishery products. Accordingly, aquaculture production decreased by 6.1% in 2020 compared to the previous year and amounted to 785 thousand tons. In 2020, 46.4% of the total seafood production was obtained through hunting and 53.6% through aquaculture. On the other hand, the total production by hunting was 364 thousand tons in 2020, while aquaculture production was 421 thousand tons. The significant increase in the share of Turkey's aquaculture in total fish production in 2020 draws attention.

Table 1.23: Fish Production in Turkey

Years	Capture fisheries (Tonnes)			Aquaculture (Tonnes)			Total (Tonnes)
	Marine-waters	Inland-waters	Total	Marine-waters	Inland-waters	Total	
2000	460.521	42.824	503.345	35.646	43.385	79.031	582.376
2001	484.410	43.323	527.733	29.730	37.514	67.244	594.977
2002	522.744	43.938	566.682	26.868	34.297	61.165	627.847
2003	463.074	44.698	507.772	39.726	40.217	79.943	587.715
2004	504.897	45.585	550.482	49.895	44.115	94.010	644.492
2005	380.381	46.115	426.496	69.673	48.604	118.277	544.773
2006	488.966	44.082	533.048	72.249	56.694	128.943	661.991
2007	589.129	43.321	632.450	80.840	59.033	139.873	772.323
2008	453.113	41.011	494.124	85.629	66.557	152.186	646.310
2009	425.275	39.187	464.462	82.481	76.248	158.729	623.191
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
2019	431.572	31.596	463.168	256.930	116.426	373.356	836.524
2020	331.281	33.119	364.400	293.175	128.236	421.411	785.811

Source: Republic of Turkey Ministry of Agriculture and Forestry, Fishery Statistics

⁵³ FAO, The State of World Fisheries and Aquaculture, 2020, (Online Access), <https://www.fao.org/state-of-fisheries-aquaculture>, 02.10.2021

Table 1.24: Fish Production, Export, Import and Consumption in Turkey

Years	Production (Tonnes)	Export (Tonnes)	Import (Tonnes)	Consumption (Tonnes)		Not Evaluated (Tonnes)	Consumption Per Capita (kg)
				Domestic	Fish flour-oil		
2000	582.376	14.533	44.230	538.764	71.000	2.309	8
2001	594.977	18.978	12.971	517.832	62.755	8.383	7,5
2002	627.847	26.860	22.532	466.289	156.000	1.230	6,7
2003	587.715	29.937	45.606	470.131	120.000	13.253	6,7
2004	644.492	32.804	57.694	555.859	105.000	8.523	7,8
2005	544.773	37.655	47.676	520.985	30.000	3.809	7,2
2006	661.991	41.973	53.563	597.738	60.000	15.843	8,2
2007	772.323	47.214	58.022	604.695	170.000	8.436	8,6
2008	646.310	54.526	63.222	555.275	95.742	3.989	7,8
2009	622.962	54.354	72.686	545.368	90.211	5.715	7,6
2010	653.080	55.109	80.726	505.059	168.073	5.565	6,9
2011	703.545	66.738	65.698	468.040	228.709	5.756	6,3
2012	644.852	74.007	65.384	532.346	94.201	9.682	7,1
2013	607.515	101.063	67.530	479.708	87.896	6.378	6,3
2014	537.345	115.682	77.545	420.361	73.667	5.180	5,5
2015	672.241	121.053	110.761	479.741	176.138	6.070	6,1
2016	588.715	145.469	82.074	426.085	93.096	6.139	5,4
2017	630.820	156.681	100.444	441.573	130.917	2.093	5,5
2018	628.631	177.500	98.315	499.055	47.276	3.115	6,1
2019	836.524	200.226	90.684	514.640	209.109	3.233	6,2
2020	785.811	201.157	85.269	559.932	107.223	2.768	6,7

Source: Republic of Turkey Ministry of Agriculture and Forestry, Fishery Statistics

The quantity of the capture of sea fish occurred 331 thousand tonnes in 2020. When we examined the distribution of the capture of sea fish, we observed that the highest amount of fish was anchovy with 171 thousand 253 tonnes. Sprat with 26 thousand 804 tonnes and Atlantic bonito with 22 thousand 743 tonnes followed the anchovy. Aquaculture production occurred as 293 thousand tonnes at the marine waters, 128 thousand tonnes at the inland waters in 2020. The most important type of fish produced at Turkey's inland waters was a trout, which were 127 thousand tonnes, in a similar fashion sea bass and sea bream were also keeping their importance in the marine waters and were produced by 148 thousand tonnes and 109 thousand tonnes respectively in 2020.⁵⁴

The most significant input costs in terms of fishing are fuel and labor. In particular, 36% of the total expenses of the ships engaged in fishing activities consists of diesel fuel and 30% of labor payments. On the other hand, the most significant input for aquaculture is feed. In this context, there is a fundamental relationship between fishing and aquaculture. In other words, the sustainability of

⁵⁴ TURKSTAT, Fisheries Statistics, 2020

aquaculture production depends on fishing. Fish flour and fish oil used in the production of fish feeds, which are the most significant production inputs of aquaculture, can be obtained from fishes such as anchovy and sprat. Also, anchovy and sprat are fishes that can only be obtained through hunting. Since the production of fish flour and fish oil in Turkey is not enough to meet the demand of the feed industry, some of these products are imported.⁵⁵

Table 1.25: The Distribution by The Capacities of Aquaculture Facilities in Turkey (2019-2020)

	2019				2020		
	Capacity Group (Tonnes)	Number of Facilities (Number)	Total Project Capacity (Tonnes)		Capacity Group (Tonnes)	Number of Facilities (Number)	Total Project Capacity (Tonnes)
Sea+Inland Water	0-50	1.332	22.650	Sea+Inland Water	0-50	1.248	22.743
	51-100	124	10.934		51-100	121	10.645
	101-250	200	39.268		101-250	214	42.409
	251-500	168	67.855		251-500	178	72.436
	501-1000	200	173.595		501-1000	192	167.531
	1001>	103	208.470		1001>	96	201.020
	Total	2.127	522.772		Total	2.049	516.784

Source: Republic of Turkey Ministry of Agriculture and Forestry, Fishery Statistics, 2020, 2021, (Online Access),

<https://www.tarimorman.gov.tr/BSGM/Belgeler/Icerikler/Su%20Ürünleri%20Veri%20ve%20Dökümanları/Su-Urünleri-İstatistikleri-temmuz-2021-1.pdf>

<https://www.tarimorman.gov.tr/BSGM/Belgeler/Icerikler/Su%20Ürünleri%20Veri%20ve%20Dökümanları/Su-Ürünleri-İstatistikleri.pdf>, 14.01.2022

According to 2019 data, 62.62% of the total aquaculture facilities in Turkey consist of a capacity of 0-50 tons. Production capacity in low-capacity facilities corresponds to 0.43% of the total aquaculture production capacity. On the other hand, aquaculture facilities with a capacity of 1001 tons and above constitute 4.84% of the total aquaculture facilities. In addition, the share of these facilities in total aquaculture production capacity is 39.87%.

In 2020, we observed that the total number of enterprises and production capacity decreased compared to the previous year. In addition, when we examined the production capacities and current production amounts of aquaculture facilities, we observed that the facilities were not operating at %100 capacity. In this direction, we think that the efforts to bring the idle capacity in the existing production areas

⁵⁵ Republic of Turkey General Directorate of Agricultural Research and Policies, FISHERY PRODUCTS SECTOR POLICY DOCUMENT 2019-2023, 2019, pp. 35-36, (Online Access), <https://www.tarimorman.gov.tr/TAGEM/Belgeler/yayin/Su%20Ürünleri%20Sektör%20Politika%20Belgesi%202019-2023.pdf>, 12.01.2022

into production will provide important gains in terms of the development and growth of aquaculture.

Table 1.26: Aquaculture Subsidies in Turkey (2003-2019)

Years	Supported Production Amount (Tonnes)	Share of Supported Production in Total Aquaculture Production (%)	Amount of Support Paid (Million TL)
2003	7.219	9	1,1
2004	26.290	28	10,5
2005	39.513	33,4	38,7
2006	63.781	49,5	58,9
2007	92.615	66,2	89,7
2008	106.757	70,1	92,7
2009	120.299	75,8	116,1
2010	150.461	90	147,5
2011	172.513	91,4	180,7
2012	147.907	69,6	101,8
2013	165.413	70,9	104,3
2014	152.284	64,8	97,7
2015	150.642	62,7	96,8
2016	70.476	27,8	43,1
2017	72.324	26,2	51,9
2018	71.177	22,6	52,5
2019	69.067	18,5	65,7

Source: İ. Şakıma, M. B. Çevrimli, The Current Situation, Problems and Solutions in Turkey's Fisheries and Aquaculture Sector, **Journal of the Veterinary Medical Association**, 92 (2): 198-218, 2021, p. 210

The aquaculture support program, which has been implemented since 2003, has contributed significantly to the quality and healthy production of the aquaculture sector, increasing its efficiency. In this context, aquaculture supports provided by the government are mostly given within the scope of organic agriculture and livestock support.⁵⁶

As we can see in Table 1.26, between 2003 and 2019, 49.9% of the total aquaculture production was supported by a total of 1.3 billion TL. In addition to trout, bream, and bass species, which are widely cultivated, aquaculture support payments are provided per kilogram of production for newly cultured species. The supported production amount was realized as 2000 tons per enterprise between 2009 and 2011. Produced fishes over this limit were excluded from the scope of

⁵⁶ H. H. Atar, U. Kömürlü, The Applications of Promotion in Aquaculture and Fisheries, **Third Sector Social Economic Review**, 53(2): 662-677, 2018, p. 664

aquaculture support. Later on, as of 2012, this limit was reduced to 500 tons. First of all, fry fish since 2013, and then bream and bass since 2016 have been excluded from the scope of aquaculture support.⁵⁷

In addition to the product support provided to the sector, the IPARD program implemented under the coordination of the Agriculture and Rural Development Support Institution provides support to enterprises engaged in processing, marketing, and production activities in the aquaculture sector. These supports, which are extremely important in terms of encouraging production, help the producers to reduce their inputs as well as ensure sustainability in production.⁵⁸ In addition, Ziraat Bank and Agricultural Credit Cooperatives provide low-interest investment and operating loans to fisheries and aquaculture. The interest rates of these loans provided to the sector are reduced by 50-75% of the current interest rate for facilities at the investment stage. On the other hand, the discount rate is 50% for the facility that is in operation. In general, these loans provide necessary financial resources for operational aquaculture facilities and facilitate the entry of new enterprises into the sector.⁵⁹ However, the requirement of insurance in the loans provided by Ziraat Bank for aquaculture facilities and the fact that small-scale enterprises are not covered by insurance due to risk causes problems in terms of financial resource supply in the sector. In addition, the fact that the facility itself is not taken into account as collateral prevents the use of credits.⁶⁰

Foreign trade of fisheries had a surplus between 2010-2020 in Turkey. In recent years, in parallel with the developments in aquaculture, a significant increase has been observed in Turkey's fisheries exports. In 2019, the highest increase in exports in the last five years was experienced, while imports decreased by 7.8%. When the export and import data for 2020 are analyzed, we observed that exports

⁵⁷ İ. Şakıma, M. B. Çevrimli, **op. cit.**, p. 211

⁵⁸ **Ibid.**, p. 212

⁵⁹ Republic of Turkey General Directorate of Agricultural Research and Policies, **op.cit.**, p.39

⁶⁰ Republic of Turkey Ministry of Development, Fisheries Specialization Commission Report 2014-2018, 2014, p. 22, (Online Access), https://www.sbb.gov.tr/wp-content/uploads/2018/10/10_SuUrunleri-1.pdf, 13.01.2022

were 115 thousand tons more in amount and 977 million dollars in monetary value than imports.

Table 1.27: The Foreign Trade of Fishery in Turkey

Year	Export	Import	Foreign Trade Balance
	Value (\$)	Value (\$)	Value (\$)
2010	312.935.016	133.829.563	179.105.453
2011	395.306.914	173.886.517	221.420.397
2012	413.917.190	176.402.894	237.514.296
2013	568.207.316	188.068.388	380.138.928
2014	675.844.523	198.273.838	477.570.685
2015	692.220.595	250.969.660	441.250.935
2016	790.303.664	180.753.629	609.550.035
2017	854.731.829	230.111.248	624.620.581
2018	951.793.070	188.965.220	762.827.850
2019	1.025.617.723	189.438.745	836.178.978
2020	1.142.857.000	165.576.000	977.281.000

Source: Compiled from TURKSTAT, Exports and Imports by Chapters, and Republic of Turkey Ministry of Agriculture and Forestry, Fishery Statistics

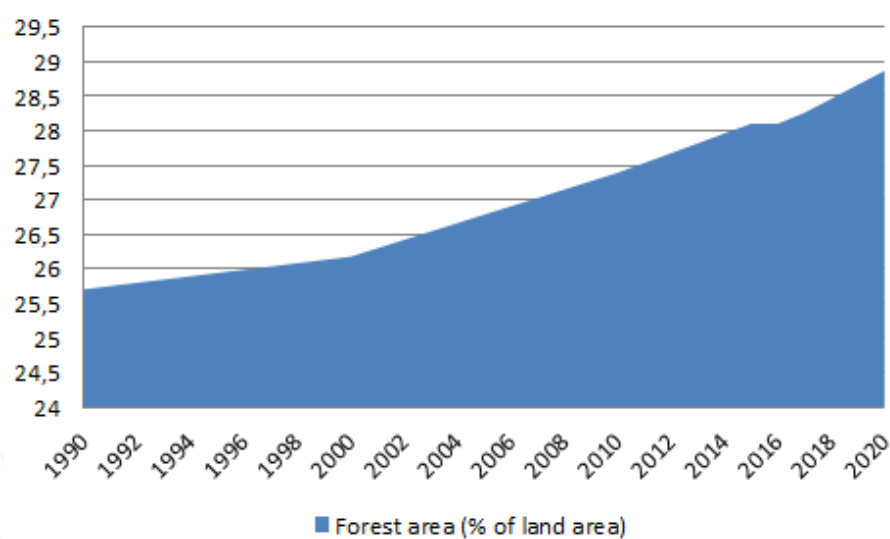
1.5.4. Forestry in Turkey

A forest is a land ecosystem, usually naturally formed, that includes various trees, shrubs, herbaceous plants, mushrooms, microorganisms, insects, and animals of a certain height and size. Forests offer many ecological, economic, and socio-cultural benefits to humanity, such as providing oxygen, ensuring water provision, preventing landslides, being the main source of wood used, providing various food sources, and creating employment. Products obtained from forests are raw materials of many different qualities such as wood, leaves, flowers, fruits, seeds, resins, bark, roots, shrubs, herbs.

In 2020, 22.9 million hectares of Turkey's land consisted of forests.⁶¹ Graph 1.7 presents the change in the share of forest areas in Turkey between 1990 and 2020. As we see in Graph 1.7, this ratio, which was 25.7% in 1990, increased to 28.8% in 2020.

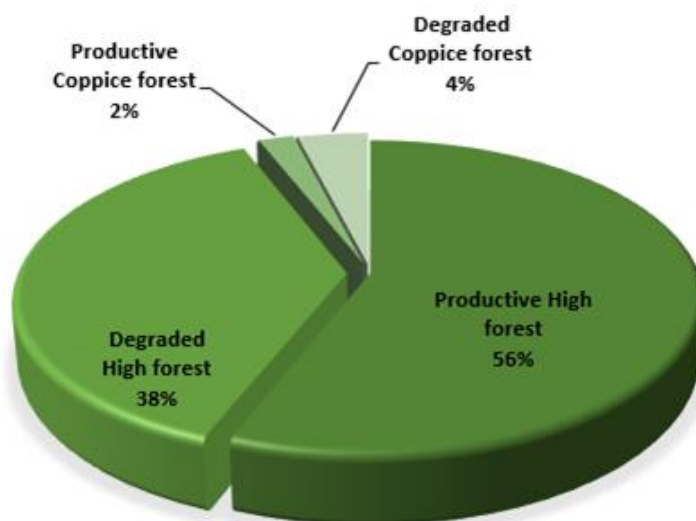
⁶¹ Republic of Turkey Ministry of Agriculture and Forestry, Forestry Statistics

Graph 1.7: Turkey's Forest Area (% of land area)



Source: Authors' Calculations⁶²

Graph 1.8: The Distribution of Turkey's Forest Land, 2020



Source: Republic of Turkey Ministry of Agriculture and Forestry

⁶² Based on the data of World Bank, Forest Area (% of land area)

In Turkey, forests are examined in two groups according to their organizational structure.⁶³ These are:

a) High forests are the forests that have been grown or will be grown from seed origin.

b) Coppice forests are the man-made forests with a large number of broad-leaved tree species and a small number of coniferous tree species.

In Turkey, forests are examined in two groups in terms of closeness.⁶⁴ These are:

a) Productive forests are the forests where the tops of trees cover 11-100% of the area.

b) Degraded forests are the forests where the tops of trees cover less than 10% of the area.

Turkey's forest land, which was 22.9 million hectares in 2020, consists of high forests with %94 occupation and coppice forests with %6. Besides, 13.2 million hectares of high forests were classified as productive, and 9.7 million hectares were classified as degraded. On the other hand, 346 thousand hectares of coppice forests were classified as productive, and 927 thousand hectares were classified as degraded.⁶⁵

In 1973, the share of high forests in total forest land was 54%, while coppice forest was 46%. Woods obtained from coppice forests are used for heating and cooking purposes. As the demand for wood used in heating and cooking activities

⁶³ Turkish Ministry of Forestry and Water Affairs, General Directorate of Forestry, Turkey's Forest Presence, 2015, p. 8, (Online Access), www.turcev.org.tr/turcevCMS_V2/files/files/TÜRKİYE%20ORMAN%20VARLIĞI%202016-2017.pdf, 11.10.2021

⁶⁴ **Ibid.**

⁶⁵ Republic of Turkey Ministry of Agriculture and Forestry, Forestry Statistics

decreased over time with technological developments, coppice forests transformed into high forests.⁶⁶

Industrial products such as logs, telephone poles, mining poles, fuelwoods, pulpwood, fiber-chip wood, thin poles, and other industrial woods are obtained from forests. Table 1.28 presents unprocessed wood production data between 2010-2020 in Turkey. Accordingly, unprocessed wood production, which was 12.5 million m³ in 2010, increased by 96.9% and reached 24.7 million m³ in 2020. On the other hand, the production of fuelwood, which was 5.3 million m³ in 2010, decreased by 24.9% in 2010 to 4 million m³. Between 2010 and 2020, Turkey's unprocessed wood production nearly doubled.

Table 1.28: Unprocessed Wood Production in Turkey (2010-2020)

Description	Unit	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Turkey (Logs of wood)	m ³	12 568 519	13 582 462	14 424 365	13 667 987	14 923 209	16 637 598	17 009 998	15 521 622	19 080 137	22 113 248	24 751 066
Turkey (Fuel wood)	m ³	5 395 779	5 083 576	4 824 506	4 486 277	3 943 496	3 767 240	3 657 801	3 269 735	3 667 841	4 192 349	4 047 510

Source: Compiled from Republic of Turkey Ministry of Agriculture and Forestry, Forestry Statistics

1.6. The Contribution of the Agricultural Sector to the Turkish Economy

Macroeconomic indicators reveal the state of a country's economy in general. In this part of the study, we will examine the contribution made by the agricultural sector to gross domestic product, employment, and foreign trade in Turkey.

1.6.1. The Contribution to Gross Domestic Product of Turkey

One of the most important macroeconomic indicators determining the place of the agricultural sector in the economy is the gross domestic product. Gross domestic product (GDP) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific period.

Table 1.29 presents Turkey's gross domestic product and the share of the agricultural sector in the gross domestic product. While the share of the agricultural

⁶⁶ S. Bekiroğlu, **et. al.**, The Origins of Coppice Forests and the Socio-Economic Dimension of Conversion of Coppice Forests to High Forests (Istanbul Case), **Journal of the Faculty of Forestry**, Istanbul University, 2013, 63(2) , p. 68

sector was 26.15% in 1980, this ratio decreased to 10.03% in 2000. This decline continued after 2000. In 2020, the share of the agricultural sector in the gross domestic product was 6.60%. Besides, 2010 was the year in which the share of the agricultural sector in the gross domestic product was the highest. In 2010, the contribution made by the agricultural sector to the gross domestic product of Turkey reached 69.6 billion dollars.

While the share of the agricultural sector in the gross domestic product has decreased over time, the share of the industry and service sectors has increased in Turkey, as has been the case in all countries in the historical process. This downward trend does not mean that the agricultural sector has lost its significance in Turkey's economy. The growth rate of the industry and service sector, which is more than the agriculture sector, is an indicator of a structural transformation that has taken place in most developing countries.

Table 1.29: The Share of Agricultural Sector in Gross Domestic Product in Turkey

Years	GDP (current US\$)	Agriculture, forestry, and fishing, value added (current US\$)	Share (%)
1980	68.789.289.566	17.985.743.970	26,15
1990	150.676.291.094	26.332.533.427	17,48
2000	274.302.959.053	27.520.411.708	10,03
2001	201.751.148.417	17.729.967.526	8,79
2002	240.253.216.295	24.483.625.199	10,19
2003	314.592.428.076	30.814.799.520	9,80
2004	408.876.042.652	38.137.597.054	9,33
2005	506.308.311.477	46.404.880.991	9,17
2006	557.057.829.051	45.093.169.968	8,09
2007	681.337.335.022	50.807.512.012	7,46
2008	770.462.156.204	57.204.260.776	7,42
2009	649.272.568.774	52.409.209.032	8,07
2010	776.992.599.947	69.672.368.046	8,97
2011	838.762.755.164	68.560.100.776	8,17
2012	880.556.375.780	67.757.735.245	7,69
2013	957.783.020.853	63.942.630.056	6,68
2014	938.952.628.604	61.569.334.841	6,56
2015	864.316.670.331	59.364.513.088	6,87
2016	869.692.960.366	53.419.081.686	6,14
2017	858.996.263.096	51.871.604.287	6,04
2018	778.377.023.569	44.957.437.163	5,78
2019	761.428.183.369	48.908.118.897	6,42
2020	720.101.212.394	47.552.245.239	6,60

Source: Compiled from World Bank Database

Tables 1.30 and 1.31 presents the gross domestic product of developed and selected developing countries in 2000, 2010, and 2020 and the share of the agricultural sector in the gross domestic product. When we analyzed the data of selected countries in 2000, we observed that the share of the agricultural sector in Turkey was 10,03%, so that higher than other countries. In 2000, the share of the agricultural sector in the gross domestic product in OCED countries was 1.77% on average. On the other hand, the share of European Union member countries was 2.20% on average, and the world average was 3.36%. After Turkey, the countries with the highest share of the agricultural sector in the gross domestic product were Russia with 5.75%, Brazil with 4.75%, and Spain with 3.75%.

By 2010, the share of the agricultural sector in Turkey's gross domestic product decreased to 8.97%. In 2010, while the share of the agricultural sector in the gross domestic product has decreased in all selected countries, the world average increased to 3.85%.

Table 1.30: The Share of Agricultural Sector in Gross Domestic Product in Selected Countries (2000 and 2010)

Years	2000			2010		
Countries	GDP (current US\$)	Agriculture, forestry, and fishing, value added (current US\$)	Share (%)	GDP Current \$	Agriculture, forestry, and fishing, value added (current US\$)	Share (%)
Turkey	274.302.959.053	27.520.411.708	10,03	776.992.599.947	69.672.368.046	8,97
Germany	1.943.145.384.190	19.330.200.848	0,99	3.396.354.075.664	27.296.388.044	0,80
Spain	596.877.648.793	22.354.892.206	3,75	1.420.722.034.063	34.539.665.395	2,43
France	1.362.248.940.483	28.584.853.510	2,10	2.642.609.548.930	42.388.204.723	1,60
United Kingdom	1.658.193.372.674	14.180.662.733	0,86	2.481.579.504.998	15.068.466.055	0,61
Netherlands	416.442.786.070	9.572.507.831	2,30	846.554.894.931	15.056.057.219	1,78
Portugal	118.310.710.337	3.679.165.285	3,11	237.880.908.318	4.607.948.164	1,94
Brazil	655.420.645.477	31.135.495.436	4,75	2.208.871.646.203	90.911.778.081	4,12
Mexico	707.906.744.575	23.524.352.130	3,32	1.057.801.295.584	34.052.257.756	3,22
Russian Federation	259.710.142.197	14.937.788.838	5,75	1.524.917.468.442	50.991.688.526	3,34
United States	10.252.345.464.000	117.948.761.000	1,15	14.992.052.727.000	156.289.352.000	1,04
OECD members	27.528.368.824.762	488.346.582.714	1,77	45.115.360.408.643	690.756.235.930	1,53
European Union	7.259.910.985.968	160.016.108.468	2,20	14.541.445.664.321	238.879.204.773	1,64
World	33.651.286.409.461	1.130.184.285.744	3,36	66.162.662.288.516	2.545.269.692.488	3,85

Source: Compiled from World Bank Database

Table 1.31: The Share of Agricultural Sector in Gross Domestic Product in Selected Countries (2020)

Years	2020		
Countries	GDP (current US\$)	Agriculture, forestry, and fishing, value added (current US\$)	Share (%)
Turkey	720.101.212.394	47.552.245.239	6,60
Germany	3.806.060.140.125	25.229.969.851	0,66
Spain	1.281.199.091.016	40.431.457.865	3,16
France	2.603.004.395.902	44.750.101.353	1,72
United Kingdom	2.707.743.777.174	15.567.957.167	0,57
Netherlands	912.242.335.119	14.543.583.055	1,59
Portugal	231.255.587.277	4.572.664.476	1,98
Brazil	1.444.733.258.972	85.319.724.464	5,91
Mexico	1.076.163.316.175	41.854.025.916	3,89
Russian Federation	1.483.497.784.868	54.892.327.478	3,70
United States	20.936.600.000.000	*	-
OECD members	52.059.613.762.688	*	-
European Union	15.192.652.399.779	252.025.171.288	1,66
World	84.705.425.882.119	3.680.296.572.215	4,34
*The 2020 data of the United States and OECD members are not disclosed.			

Source: Compiled from World Bank Database

In 2020, the agricultural sector in Turkey constituted 6.60% of the gross domestic product with 47.5 billion dollars. In addition, the world average was 4.34%. Finally, according to the comparison made between selected countries, we observed that the share of the agricultural sector in Turkey in 2020 was higher than in other countries.

1.6.2. The Contribution to Employment of Turkey

With the development of the economy in Turkey, the transfer of labor from the agricultural sector to other sectors has become more evident after 1990. While the share of the agricultural sector in employment was 29.76% in 1991, this rate decreased to 18.11% in 2019. The decrease in the share of the agricultural sector in employment and the diminish in the rural population showed parallelism in Turkey. The decrease in the share of agricultural employment in total employment is directly affected by factors such as the use of technology in agriculture and the increase in the demand for labor in other developing sectors.

Table 1.32: Agricultural Employment and Rural Population in Turkey

Years	Population (total)	Rural population (% of total population)	Labor force (total)	Employment in agriculture (% of total employment)
1991	54.840.595	40,02	20.039.967	29,76
2000	63.240.196	35,26	21.416.630	27,30
2001	64.192.243	34,66	21.767.789	27,14
2002	65.145.357	34,03	22.072.114	26,87
2003	66.089.402	33,40	21.907.831	26,31
2004	67.010.930	32,78	21.874.677	25,51
2005	67.903.461	32,16	22.316.756	24,80
2006	68.756.809	31,55	22.241.100	24,06
2007	69.581.854	30,95	22.626.118	23,48
2008	70.418.612	30,35	23.362.747	23,14
2009	71.321.406	29,76	24.208.672	22,95
2010	72.326.992	29,18	25.218.827	23,70
2011	73.443.254	28,60	26.282.989	24,16
2012	74.651.046	28,03	26.782.237	23,56
2013	75.925.454	27,47	27.838.130	22,92
2014	77.229.262	26,92	28.688.617	21,09
2015	78.529.413	26,39	29.779.757	20,41
2016	79.827.868	25,87	30.831.350	19,50
2017	81.116.451	25,36	31.962.763	19,38
2018	82.340.090	24,86	32.833.549	18,43
2019	83.429.607	24,37	33.318.941	18,11

Source: Compiled from World Bank Database

Table 1.33: Agricultural Employment in Selected Countries (2000, 2010 and 2019)

Years	2000	2010	2019
Countries	Employment in agriculture (% of total employment)	Employment in agriculture (% of total employment)	Employment in agriculture (% of total employment)
Turkey	27,30	23,70	18,11
Germany	2,64	1,65	1,21
Spain	6,69	4,20	4,03
France	4,14	2,91	2,53
United Kingdom	1,54	1,22	1,05
Netherlands	3,28	3,06	2,08
Portugal	12,68	11,20	5,50
Brazil	16,49	12,66	9,08
Mexico	17,41	13,92	12,48
Russian Federation	14,49	7,75	5,83
United States	1,63	1,42	1,36
OECD members	6,85	5,57	4,80
European Union	8,97	5,81	4,37
World	39,91	33,03	26,76

Source: Compiled from World Bank Database

Table 1.33 presents agricultural employment data in selected countries for the years 2000, 2010, and 2019. While the share of agricultural employment in total employment varies between 1% and 4% in developed countries such as Germany, England, France, the Netherlands, and the United States, this rate is above 10% in developing countries.

In 2000, the share of agricultural employment in total employment in Turkey was 27.30%. When we analyzed the data for 2010, we observed that the share of agricultural employment in total employment had decreased in all selected countries. In addition, the share of agricultural employment in total employment in Turkey decreased to 23.70% in 2010. The downward trend did not change in 2019 either. When we compared Turkey to the World, the European Union, and OECD, we observed that the share of agricultural employment in total employment in Turkey was above the average in 2000, 2010, and 2019.

While the share of the agricultural sector in the gross domestic product was 7.88% on average between 2000 and 2019, its share in employment was 23.41% on average. In this period, the share of the agricultural sector in gross domestic product declined more than its share in total employment. The situation Turkey is experiencing stems from structural problems in the agricultural sector. This imbalance caused by structural issues led to the deterioration of income distribution to the detriment of the agricultural sector. In particular, the low level of education of those working in the agricultural sector limits their employment opportunities in other sectors.⁶⁷

Generally, the factors limiting the contribution of the agricultural sector to Turkey's economy can be listed as:

- a) low productivity level,
- b) insufficient capital accumulation,
- c) insufficient use of technology,
- d) small and fragmented agricultural lands,

⁶⁷ S. Erdoğan, and A. Gedikli, **op. cit.**, p. 232

- e) low education level in rural areas,
- f) hidden unemployment,
- g) limited production capacity for national and international markets.⁶⁸

1.6.3. The Contribution to Foreign Trade of Turkey

Since Turkey is a country suitable for agriculture in terms of soil, nature, and climatic conditions, agricultural products have always been included in its foreign trade. In the 1970s, the share of the agricultural sector in exports was 70%. Later on, this rate, which was 56% in 1980, decreased to 15.6% in 1990.⁶⁹

Table 1.34: The Foreign Trade of Agricultural and Forestry Products in Turkey

Years	Value: Thousand US \$			Years	Value: Thousand US \$		
	Total Exports by (ISIC, Rev.3)	Export of Agricultural and Forestry Products	Share (%)		Total Imports by (ISIC, Rev.3)	Import of Agricultural and Forestry Products	Share (%)
2000	27.774.906	1.659.092	5,97	2000	54.502.821	2.123.187	3,90
2001	31.334.216	1.976.410	6,31	2001	41.399.083	1.409.313	3,40
2002	36.059.089	1.754.287	4,87	2002	51.553.797	1.702.642	3,30
2003	47.252.836	2.120.690	4,49	2003	69.339.692	2.535.427	3,66
2004	63.167.153	2.541.777	4,02	2004	97.539.766	2.757.392	2,83
2005	73.476.408	3.328.814	4,53	2005	116.774.151	2.801.365	2,40
2006	85.534.676	3.480.539	4,07	2006	139.576.174	2.902.369	2,08
2007	107.271.750	3.725.213	3,47	2007	170.062.715	4.640.577	2,73
2008	132.027.196	3.936.711	2,98	2008	201.963.574	6.391.914	3,16
2009	102.142.613	4.347.483	4,26	2009	140.928.421	4.593.839	3,26
2010	113.883.219	4.934.710	4,33	2010	185.544.332	6.456.707	3,48
2011	134.906.869	5.166.596	3,83	2011	240.841.676	8.895.184	3,69
2012	152.461.737	5.188.858	3,40	2012	236.545.141	7.446.641	3,15
2013	151.802.637	5.653.323	3,72	2013	251.661.250	7.718.045	3,07
2014	157.610.158	6.029.749	3,83	2014	242.177.117	8.588.523	3,55
2015	143.838.871	5.756.596	4,00	2015	207.234.359	7.176.330	3,46
2016	142.529.584	5.397.249	3,79	2016	198.618.235	7.041.368	3,55
2017	156.992.940	5.287.137	3,37	2017	233.799.651	8.986.755	3,84
2018	167.920.613	5.556.333	3,31	2018	223.047.094	9.284.091	4,16
2019	171.464.945	5.515.507	3,22	2019	202.704.320	9.466.458	4,67

Source: Compiled from TURKSTAT, Foreign Trade Statistics, Imports and Exports by Economic Activities⁷⁰

⁶⁸ S. Erdoğan, and A. Gedikli, **op. cit.**, p. 232

⁶⁹ **Ibid.**

⁷⁰ Table 2.6 includes agriculture, animal production, forestry, logging, and related service activities (fishing and manufactured products not included)

Table 1.34 presents the shares of agricultural and forestry products in total import and exports in Turkey between 2000-2019. In 2000, the export value of agricultural and forestry products was 1.6 billion dollars, constituting 5.07% of the total exports. Later on, in 2019, the export value of agricultural and forestry products reached 5.5 billion dollars, and its share in total exports decreased to 3.22%. The year with the highest export value of agricultural and forestry products was 2014 with 6 billion dollars.

In 2000, the import value of agricultural and forestry products was 2.1 billion dollars, constituting 3.90% of the total imports. Later on, in 2019, the import value reached 9.4 billion dollars, and its share in total imports decreased to 4.67%. The year with the highest import value of agricultural and forestry products was 2011 with 8.89 billion dollars. In addition, we observed that while the share of agricultural and forestry products in exports decreased, their share in imports first diminished and then started to increase again after 2014. One of the main factors affecting the decrease in the share of agricultural products in exports is the rapid increase in the share of other sectors in exports compared to the agricultural sector.

The foreign trade balance in agricultural and forestry products had fluctuated over the years in Turkey. Especially in 2007 and the following years, the foreign trade deficit has become permanent. In 2019, Turkey's foreign trade deficit which was 3.9 billion dollars in agricultural and forestry products, reached its highest level in the last 20 years.

The export-import ratio refers to the ratio of the value of exported goods and services to imported goods and services of the countries involved in international trade. An improvement of a nation's export-import ratio benefits the country in the sense that it can have more export than its value of imports. When we examined the foreign trade of agricultural and forestry products in Turkey, we observed that this ratio was over 100% in the years 2001, 2002, 2005, and 2006.

Table 1.35: The Foreign Trade Balance of Agricultural and Forestry Products in Turkey

Years	Value: Thousand US \$	
	Foreign Trade Balance of Agricultural and Forestry Products	Export / Import Ratio (%)
2000	-464.095	78,14
2001	567.097	140,24
2002	51.646	103,03
2003	-414.737	83,64
2004	-215.615	92,18
2005	527.449	118,83
2006	578.170	119,92
2007	-915.364	80,27
2008	-2.455.203	61,59
2009	-246.356	94,64
2010	-1.521.996	76,43
2011	-3.728.588	58,08
2012	-2.257.783	69,68
2013	-2.064.723	73,25
2014	-2.558.773	70,21
2015	-1.419.734	80,22
2016	-1.644.118	76,65
2017	-3.699.618	58,83
2018	-3.727.758	59,85
2019	-3.950.951	58,26

Source: Authors' Calculations⁷¹

⁷¹ Based on the data of TURKSTAT, Foreign Trade Statistics, Imports and Exports by Economic Activities

CHAPTER TWO

AGRICULTURAL POLICIES IN TURKEY

In this part of the study, first, we will provide information about the definition, scope, objectives, and tools of agricultural policy. Second, we will investigate the historical development of agricultural policies implemented in Turkey between 1923-2000. Third and lastly, we will examine the agricultural policies implemented after 2000 using the support data compiled from the annual development programs.

2.1. The Definition and Scope of Agricultural Policy

The fact that agriculture is a biological process dependent on natural conditions is the most significant feature that distinguishes the sector from others. In this context, uncertainties and risks that occur together with these features in the agricultural sector necessitate government intervention. We can define agricultural policies as all kinds of measures and regulations carried out by institutions representing the state for agriculture. As a political power center, the state should take a regulatory role between the agricultural sector and other sectors by addressing agricultural problems and the problems of rural areas. The primary factors that lead states to create interventionist agricultural policies are ensuring food security, self-sufficiency in agricultural production, and increasing productivity in the agricultural sector.⁷²

“Rausser defines agricultural policy as a complex web of interventions covering output markets, input markets, trades, public investments, renewable and exhaustible natural resources, regulation of externalities, education, and the marketing and distribution of food products”.⁷³

⁷² N. Erdoğan, **Agricultural Economics and Finance**, Gazi Publishing House, 1st Edition, 2020, p. 73

⁷³ C. G. Rausser, Predatory Versus Productive Government: The Case of U.S. Agricultural Policies, **Journal of Economic Perspectives**, 6(3), 1992, p. 133

2.2. The Objectives of Agricultural Policy

In the Turkish Agricultural Law published in the official newspaper in 2006, the objectives of the agricultural policies were stated as the development of agricultural production in accordance with domestic and foreign demand, protection and development of natural and biological resources, increasing productivity, strengthening food security and safety, developing producer organizations, strengthening agricultural markets, and elevating the welfare level in the agricultural sector by providing rural development.⁷⁴

The objectives of agricultural policies can be examined under three different headings in general, according to policies' target audiences. These can be listed as follows:

- a) Agricultural producers and farmers: increasing the economic welfare of the producers by increasing their income levels,
- b) Consumers of agricultural products: improving consumer's access to agricultural products in terms of quality, price, and quantity,
- c) Future generations: ensuring sustainable agriculture and agricultural development.

In the presence of conditions that prevent perfect competition in the market, it is inevitable for the state to intervene by taking necessary measures through agricultural policies. In this context, the conditions under which the states should intervene in the sector can be listed as:

- a) the market is not fully open and transparent,
- b) agricultural enterprises cannot adapt to the market economy and are weak in the face of competition,
- c) production or markets are concentrated in specific hands,
- d) factor mobility is limited.

⁷⁴ Turkish Agriculture Law, No. 5488, 2006, Article 4, 2006

Thanks to this intervention, the price level of the products will be reduced, the production level will be maintained, and the consumer's access to the product will be easier.

Although the goods that people need are endless, the resources used in their production are limited. Agricultural policies aim to increase agricultural productivity by providing effective use of resources in the country. In this context, the state regulates technological efficiency, supply-demand balance, and the distribution of production factors among enterprises through agricultural policies. In addition, another factor affecting agricultural productivity is employment. Migration from rural areas to cities directly affects agricultural employment. If the agricultural employment in a country is higher than the existing resources, in other words, if the real income of the people employed in agriculture does not increase while the total real production increases, the migration from rural areas to cities accelerate. As a result, the lower-income levels of those working in the agricultural sector compared to other sectors and the imbalance in income distribution necessitate the government to make regulations in this area.

The states aim to increase the contribution of the agricultural sector to the countries economy by developing agricultural production in accordance with domestic and foreign demand. In this context, the states encourage the cultivation of products suitable for export and domestic production of products that have high imports.

One of the objectives of agricultural policies is to ensure food security in the country, and food security has strategic importance for countries. Self-sufficiency of the country's nutritional needs contributes significantly to economic independence and development. On the other hand, ensuring the nutritional needs from outside creates an economic burden and weakens the government's control over the prices of products.

Other objectives of agricultural policies are to prevent waste of water by using resources effectively and hamper the use of agricultural lands for purposes other than what they have been designed for. In addition, it embodies significant

importance for the state to ensure the ecological balance in terms of providing the people with rest and leisure time, reviving domestic and foreign tourism, and protecting natural life.

2.3. Tools of Agricultural Policy in Turkey

In the Turkish Agricultural Law published in the official newspaper in 2006, tools of agricultural policies were stated as direct income supports, deficiency payments, compensatory payments, livestock support payments, agricultural insurance support payments, rural development support payments, the environmentally-based agricultural land support program payments, and other support payments. The financing of these supports is provided from budget sources and external sources.⁷⁵ In Article 21 of the Turkish Agricultural Law, it is stated that these resources which will be allocated from the budget for financing agricultural policies shall not be less than one percent of the gross domestic product of the country.⁷⁶

Direct income support is the direct payment made to the producers over the unit payment amount determined by the Council of Ministers for the lands they have cultivated for agricultural production. Payment amounts can be determined at different levels in order to facilitate producers' compliance with agricultural policy objectives and environmental protection conditions. The principles and procedures regarding direct income support payments are determined by the implementation of the manifestos issued by the Ministry every year, in a way that does not contradict the basic structure of Turkish agricultural law. Implementation notifications are published within the first two months of the relevant year. The Ministry may issue additional manifestos when necessary.⁷⁷

The deficiency payment is the payments made to the farmers by taking into account the production costs and domestic and foreign prices. The difference payment support primarily covers products with short supplies. Each year, the

⁷⁵ Turkish Agriculture Law, No. 5488, 2006, Article 19, 2006

⁷⁶ Turkish Agriculture Law, No. 5488, 2006, Article 21, 2006

⁷⁷ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (a)

products to be included in the deficiency payment and the payment amounts are determined by the Council of Ministers.⁷⁸

The purpose of compensatory payments is to encourage producers to abandon the production of products with excess supplies and turn to alternative products. Compensatory payments are made to producers to prevent loss of income from growing alternative crops on their land. The amount of payment to be made for each producer is calculated by multiplying the amount of land allocated by the producer for the production of alternative products and the unit payment amount. The product scope of compensatory payments, unit payment amounts on the basis of products, payment periods, and additional payment amounts are determined every year.⁷⁹

The main targets of livestock supports can be listed as racial improvement in livestock activities, increasing roughage production, increasing productivity, specialization of enterprises, ensuring hygienic conditions, animal health and welfare in enterprises, promotion of the animal identification system, processing and marketing of animal products, and supporting aquaculture. The monetary amount of livestock subsidies may differ on the basis of regions and provinces.⁸⁰

Agricultural insurance payments are issued to encourage producers to secure their production materials and products. Some of the insurance premium costs are covered by the State.⁸¹

The aims of rural development supports can be listed as increasing and diversifying rural incomes, developing rural infrastructure, consolidating agricultural lands, strengthening the social structure, and protecting natural resources. In this context, a part of the cost of investment projects is covered by the state. In addition, while providing these supports, the state gives initiative to agricultural and non-agricultural economic investments that provide employment to the people living in rural areas. In projects to be supported within the framework of rural development supports, it is essential to comply with the principles of participation of the target

⁷⁸ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (b), 2006

⁷⁹ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (c), 2006

⁸⁰ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (ç), 2006

⁸¹ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (d), 2006

audience and local stakeholders, sustainability, use of appropriate technologies, and dissemination of modern management systems.⁸²

The environmentally-based agricultural land program supports are provided to encourage producers that engaged in cultivation in agricultural lands which were exposed to erosion and adverse environmental effects to use their lands for natural vegetation, meadows, pastures, organic farming, and afforestation. The environmentally-based agricultural land support payment to be made for each producer is calculated by multiplying the amount of land to be allocated by the producers for this program and the unit payment amount. Producers are also requested to take environmental protection measures on these lands.⁸³

The government can intervene in agricultural product prices to prevent farmers from being harmed by excessive price fluctuations and low agricultural product prices. This intervention takes two forms. While the first is the intervention of the state or state-owned institutions in order to increase the prices of agricultural products, the second is to determine a price without interfering with the market conditions and pay the difference between the market price and the determined price to the producer.⁸⁴

In the base price application, the state ensures that the price of the products does not fall below a certain level in order to protect the producer. In this context, for this practice to be realized, the state must enter the market directly. On the contrary, in the implementation of financial aid, the state provides price guarantees for specific products in order to protect the producer. In this way, the state does not directly intervene in the market. If the market price of the products within the scope of this application is below the price determined by the government, the difference is paid to the producer.⁸⁵

⁸² Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (e), 2006

⁸³ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (f), 2006

⁸⁴ Z. Dinler, **Agricultural Economics**, Ekin Publishing, 5th Edition, 2000, p. 275

⁸⁵ G. Arslan, “The Main Problems of the Agricultural Sector in Turkey and the Effects of Agricultural Policies on the Turkish Economy: 2000-2018”, **Nevşehir Hacı Bektaş Veli University**, Master Thesis, 2021, p.46

The state aims to reduce the production costs of the producer with input supports. In this context, the state ensures that agricultural inputs such as fertilizer, diesel, and pesticide reach the producers at a lower price or without charge.

By using import restrictions, the government imposes trade restrictions on certain products that world prices are lower than domestic prices. The primary purpose here is to protect the producers from foreign competition and support the domestic prices in favor of the producers. In this context, the effect of foreign trade on the producer is reduced by limiting the number of products entering the country with import quotas. As a result of this practice, if the supply cannot meet the demand, domestic prices of the products increase. In this way, the producer is supported as much as the domestic price of the products increase.

The purpose of the state in using export supports is to increase domestic production. In this application, the state determines an export price above the world price for certain products and supports the producers as much as the difference between the sales price and the determined price.

In addition to price and foreign trade-oriented practices, the state can apply structural reforms in order to provide permanent solutions and improvements. The most important of these structural reforms in terms of the agricultural sector is the consolidation of lands. Small and fragmented land structures are one of the most significant factors affecting agricultural productivity. Land consolidation is the process of arranging small, fragmented, and unproductive lands of enterprises in order to improve the agricultural structure and increase production level in a way that will enable the development of irrigation systems suitable for modern agriculture.⁸⁶

Other support payments can be listed as research, development, publication and consultancy support, marketing incentives, storage support, quality support, organic production support, destruction support, product processing support, and other support tools in similar subjects.⁸⁷

⁸⁶ G. Arslan, **op. cit.**, p. 53

⁸⁷ Turkish Agriculture Law, No. 5488, 2006, Article 19, Subtitle (g), 2006

2.4. The Development of Agricultural Policies in Turkey

2.4.1. 1923-1963

In the first years of the Turkish Republic, the economy was largely based on agriculture. The productivity of the agricultural structure taken over from the Ottoman Empire was at low levels. The main reasons for this low productivity level in agriculture were the technological backwardness of the production techniques, the inadequacy of the physical capital, and the insufficient knowledge of the villagers. With the establishment of the Republic, Turkey, which wants to continue on its way with the idea of a new order, new understanding, and a new structure, has taken measures that can be considered crucial, especially in tax, credit, and land ownership in order to increase agricultural production. On the other hand, inheritance from the Ottoman Empire and the war conditions of the period had a significant effect on the agricultural policies implemented in the first years of the Republic. Between 1923 and 1930, Turkey had to follow a liberal policy due to the restrictions of the Treaty of Lausanne. According to this agreement, Turkey took over the remaining debts during the Ottoman period and had to keep the customs taxes at low prices. Later on, these liberal policies started to change after the 1929 Economic Depression.

In February 1923, the Izmir Economy Congress convened, and the problems of the farmers were brought to the agenda. As a result of the negotiations, decisions were taken that will lay the groundwork for the initiation of radical changes and transformations in the field of agriculture. Prominent among these decisions were:

- a) abolition the tithe,
- b) abolition of the land ownership right of foreigners
- c) providing tax exemption for the development of the agricultural sector,
- d) abolishing the tobacco monopoly and liberalizing the cultivation and trade of tobacco,
- e) regulating agricultural credits,
- f) standardization of agricultural tools and machinery,
- g) establishment of repair shops,

- h) developing animal husbandry,
- i) production of fish in lakes.⁸⁸

In line with these decisions, the first public organization of the state for agriculture took place in this period, and in this context, a new ministry was established in 1924 under the name of the Ministry of Agriculture. In addition, the Ziraat Bank Budget Law, which was accepted in the Turkish Grand National Assembly in March 1924, turned the bank's structure into a Joint Stock Company. In 1925, the tithe, in which one-tenth of agricultural products was taken as a tax, was abolished. With the abolition of the tithe, large landowners and poor peasants were relieved of a heavy burden.⁸⁹ In 1925, it was decided that the tobacco processing industry, which was in the hands of the foreign administration, would be carried out by the state. Thus, the tobacco factories established in the last quarter of the 19th century transferred under the control of the state.⁹⁰ In addition to all these, the Civil Code and the Code of Obligations were adopted in 1926. With these laws, the legal foundations of private property were established in the country. Thanks to these lands distributed between 1923-1934, agricultural activities began to be carried out on new 7.11 million decarees of land. However, the applications could not reach the desired result due to the fact that the cadastral system was not developed and was based on mixed documents from the Ottoman period.⁹¹ In this context, with the development of the concept of private property, the Land Registry Law was adopted in 1934 in order to record immovable properties.

The price supports through intervention purchases was first started in 1932. In this context, the first purchases were made by the Ziraat Bank in wheat. Later on, the Turkish Grain Board was established in 1938 to ensure market security. After 1938,

⁸⁸ Y. Kepenek, and N. Yentürk, **Turkish Economy**, 19th Edition, Remzi Bookstore, 2007, p. 35

⁸⁹ S. R. Karluk, **Turkish Economy: Historical Development, Structural and Social Change**, Beta, 2002(a), p. 176

⁹⁰ H. Albayrak, “A Participatory Model Suggestion in Turkish Agriculture in Terms of EU Agricultural Policies: The Example of TIGEM”, **İnönü University**, Ph.D. Thesis, 2016, p. 111

⁹¹ E. Rehber, and H. Vural, **op. cit.**, p. 261

intervention purchases were carried out by the Turkish Grain Board instead of the Ziraat Bank.⁹²

Supports applied by the state to inputs such as tractors, seeds, and fertilizers in order to increase agricultural production also started in this period. The first support for mechanization started with the Ziraat Bank's purchase of 70 units of tractors. In addition, with a law enacted in 1924, machinists in agricultural enterprises using tractors and a certain number of technical personnel tasked to repair agricultural tools and machinery were exempted from military service. In 1926, fuel tax exemption was provided to farmers using agricultural machinery.⁹³ As a result of the first support for mechanization, the number of tractors increased from 600 units in 1926 to 2003 units in 1929. In the same period, the number of water pumps reached 550 units.⁹⁴

In this period, small producers cannot obtain loans from banks because they cannot provide collateral. This situation leads small producers to loan sharks who give loans with high interest instead of banks. After 1923, the fact that the villagers found themselves in this situation had a decreasing effect on the volume of agricultural production in general. In order to break this vicious cycle, it was necessary to establish an alternative institution that would provide the credits of the farmers. In order to solve this problem, first the Agricultural Credit Cooperatives Law in 1929 and then the Agricultural Credit Cooperatives and Agricultural Sales Cooperatives Laws were enacted in 1936. With the establishment of the Credit and Sales Cooperatives, the credit requirement of the producers began to be provided under more favorable conditions. Also, with these developments, the products began to be offered for sale at better prices through the cooperative channels. In addition, sales cooperatives took an active role in the export of agricultural products.⁹⁵

During the First World War, agricultural production increased rapidly to finance the war. In the post-war period, due to the rapid decline in demand, the

⁹² E. Rehber, and H. Vural, **op. cit.**, p. 239

⁹³ H. Albayrak, **op. cit.**, p. 112

⁹⁴ H. C. Kayam, “Agricultural Policies in Turkey (1928-1938)”, **Yıldız Technical University**, Ph.D. Thesis, 1997, p. 89

⁹⁵ H. C. Kayam, **op. cit.**, p. 158

agricultural sector in most countries started to produce surpluses. This situation caused the prices of agricultural products to fall rapidly. In this context, the rapid decrease in the price of agricultural products adversely affected countries such as Turkey, in which agricultural products constitute the majority of their exports. After all these developments, with the start of the Great Depression in 1929, the food crisis deepened even more. After this period, Turkey realized that international trade was not sufficient for the development of the country. Therefore decided to establish a statist economic structure by making a fundamental political change. The main reason for this change that Turkey went through in the 1930s stems from the fact that the incapability to export its agricultural products.⁹⁶

After 1929, the development of industrial branches that use agricultural products as raw materials took priority by the Turkish government. In this context, the three agricultural products that stood out during this period were sugar beet, cotton, and tobacco. The first movement of industrialization took place in the field of textiles. With the plan created with the etatism model, a capacity that can meet 80% of the domestic demand in the textile sector has been created. On the other hand, Eskişehir Sugar Factory in 1933 and Turhal Sugar Factory in 1934 were put into service with the partnerships of the national banks. Later on, the Turkish Sugar Factories Joint Stock Company was established, and the control of four different sugar factories was taken over by this company. Apart from all these, the first cooperative movements in Turkey were initiated in order to organize sugar beet producers. In the period covering 1951-1956, eleven new sugar factories were established, and the total number of sugar factories reached 15 in 1956. With these developments, Turkey aimed to meet its sugar demand entirely with domestic production.⁹⁷

In 1937, state-owned production farms began to be established. The primary purposes of these facilities can be listed as teaching modern agricultural techniques to the farmers and providing necessary seed supply and breeding animals to the farmers. These developments were followed by the foundation of the Turkish

⁹⁶ H. Albayrak, *op. cit.*, p. 113

⁹⁷ E. Rehber, H. Vural, *op. cit.*, pp. 262-263

Agricultural Equipment Institution in 1944, which aimed to provide agricultural production inputs to farmers.⁹⁸

With the Second World War that started in 1939, the statist economic policies implemented in Turkey began to be abandoned. Although Turkey did not actually participate in this war, it made preparations as if it would. This situation put a heavy burden on the country's economy. In particular, the compulsory recruitment of young men of working age into the army directly affected agricultural employment. In addition, the army's seizure of animals used in agricultural production also directly affected the country's agricultural production level. During the Second World War, there was a decrease in agricultural production, and even shortages were observed in some products. The most distinctive feature that characterizes the war period is the rapid reversal of the price decreases, especially in wheat, during the Depression.

The National Protection Law, which came into force in 1940, is one of the precautionary steps taken by Turkey to get rid of the negative effects of the Second World War. With this law, the government had extensive privileges over the producers and workers through their production facilities. These extensive privileges mean that the government has all kinds of authority to control the market. Thus, the intervention of the state in the economy increased, and the government decided to use an exploitative price policy during this period. With the decrease in production, an inflationary period was experienced in the country. While the prices of all products except agriculture increased, the income of the farmers remained stable. In this period, the lack of production of basic foodstuffs such as flour and sugar adversely affected consumers. In this context, insufficient flour production forced the government to keep bread consumption under control.⁹⁹

In 1940, village institutes were opened in order to train teachers and staff who were necessary for the development of villages. The aims of the village institutes project can be listed as educating the people living in rural areas, making the villagers more active in economic, social, and cultural fields, and raising the level of

⁹⁸ E. Rehber, H. Vural, **op. cit.**, p. 263

⁹⁹ S. Bingöl, and O. Meçik, New Capitalism and Transformation of the Agricultural Sector in Turkey, Afyon Kocatepe University, **Journal of Social Sciences**, 23(2), 2021, p. 58

consciousness of the villagers. Thus, the state would realize a structural change in the rural areas and ensure economic development in the rural areas.

In 1943, the Agricultural Product Tax began to be applied, in which between 8 and 12 percent of agricultural products was taken as a tax. In particular, this practice has adversely affected small and medium-sized farmers. The Agricultural Product Tax provided income to the state during the Second World War and continued to be applied until 1946. In addition to the heavy tax burden, another policy for agricultural producers was the obligation of producers to sell their products to the Turkish Grain Board.

One of the positive developments experienced in this period was the Law of Providing Land to Farmers, which was enacted in 1945. This law aimed to distribute lands that were owned by the state to farmers. After the enactment of this law, a total of 16.7 million decares of land were distributed to 336 thousand families between 1947-1959.¹⁰⁰

In July 1944, while the war was still going on, economic congress was held at Bretton Woods, with the participation of 44 countries and the leadership of the USA, in order to eliminate the negativities to be experienced in world trade and to rebuild Europe, which was destroyed in the war. As a result of this congress, institutions such as the International Monetary Fund and the World Bank that will shape the world's economies and policies have emerged. Turkey became a member of the IMF and WB in 1947. In this context, the most important development for Turkey in the post-war period was its inclusion in the Marshall Plan in 1947. The Marshall Plan was created for the reconstruction of Western Europe after the Second World War. Turkey was included in the plan after a long persuasion effort, but the supports that Turkey would receive within the framework of the Marshall Plan was subjected to very strict conditions. Within the scope of this plan, Turkey's duty was to develop the agricultural sector with the aid it receives and to help the food shortage in Western Europe.¹⁰¹

¹⁰⁰ S. Bingöl, and O. Meçik, **op. cit.**, p. 58

¹⁰¹ H. Albayrak, **op. cit.**, p. 118

Within the scope of the Marshall Plan, the economic model suggested by the American experts in their assessment for Turkey was to create an economy that is far from protectionism and specializes in agriculture. In this context, experts suggested that investments should be made in agriculture and agro-based industries instead of inefficient industrial factories, and the government should focus on highways and infrastructure investments. Also, to preserve the benefits of economic development upon the residents of the country, agricultural machinery and food manufacturing sectors have to be seriously considered.¹⁰² With the start of mechanization in agriculture number of tractors and the number of tractors was increased. In this period, the number of tractors, which was 1.7 thousand units in 1948, reached 42 thousand units in 1958, the number of combine harvesters, which was 994 units in 1948, reached 6 thousand units in 1958. In addition, the credit opportunities provided to agriculture were expanded, and the volume of agricultural credits, which was 235 million TL in 1948, reached 412 million TL in 1950 and 2 billion 313 million TL in 1960.¹⁰³

With the transition to the multi-party system in 1945, a new political period and process started for Turkey. After the war and economic depression, the work on the agricultural sector started to gain momentum again with the coming to power of the Democratic Party (1950). With the policies implemented in the first period, state-owned lands were provided to producers for agricultural activities, family enterprises were more prioritized instead of cooperatives, and mechanization within the agriculture sector started to take a huge pace.¹⁰⁴

After the war, statist economic policies started to replace with liberal economic policies. Although it was desired to reduce the intervention of the state in the economy between 1950-1963, the existing Public Economic Institutions were not transferred to the private sector in this period. In addition to the institutions that were not transferred, many new institutions such as Meat and Fish Authority, Feed Industry Joint Stock Company, Cellulose, and Paper Industry came into operation.

¹⁰² S. Bingöl, and O. Meçik, **op. cit.**, p. 58

¹⁰³ H. Albayrak, **op. cit.**, p. 118

¹⁰⁴ R. Erbay, *The Role of Agriculture in Economic Development: An Evaluation of Turkey*, **Namık Kemal University Open Archive**, Master Thesis., p. 11

Besides that, support and protection policies for agricultural products continued to exist. In this period, products such as sugar beet, tea, hazelnuts, dried grapes, dried figs, and olive oil were included in the scope of support programs, and related policies were established to keep the production of certain products such as tobacco and poppy under control.¹⁰⁵ The investments made by the state in highways by making use of Marshall Aids played a direct role in opening the rural areas to the market and expanding their production.

2.4.2. 1963-1980

With the dismissal of the Democrat Party from the government as a result of a military coup in 1960, a new political era started in Turkey. In this context, there had been notable changes in the policy implications related to the development of the agricultural sector. Especially after the 1960s, the main objective of agricultural policies was established based on five-year development plans. From the early 1960s to the 1970s, the agricultural sector maintained its importance in development plans. Mechanization and the use of technological inputs in agriculture, which started with the Marshall Plan in the 1950s, continued to increase rapidly in this period. In particular, the resource transfers made by the World Bank to villages and peasants in order to prevent the spread of communism contributed significantly to the acceleration of mechanization and the increase in agricultural production. These supports gained momentum when the US Secretary of Defense, Robert McNamara, was appointed as the head of the World Bank in 1968. The loans given by the bank to Turkey increased from 44 million dollars in 1960 to 556 million dollars in 1970. In addition, the World Bank also financed the projects of the Development Foundation of Turkey, which was established in 1969.¹⁰⁶

By considering all the policy tools that had been implemented between 1963 and 1980, the price supports were one of the policy tools that grabbed our attention. The reason for that is based on the policy tools that had been implemented in this

¹⁰⁵ T. Eğri, Transformation and Farmer Perception in Turkish Agricultural Policies After 2000: The Case of Kırklareli, Anadolu University, **Journal of Social Sciences**, 14(1) , 2016, p. 98

¹⁰⁶ H. Albayrak, **op. cit.**, p. 122

period changed from input subsidies to price supports. While only six¹⁰⁷ products were included in the scope of price supports at the beginning of the planned period, the number of products increased rapidly after the planned period, reaching twenty-four¹⁰⁸ in 1970.¹⁰⁹ In the election years, price supports through intervention purchases were increased in order to gain the favor of the villagers. Large producers benefited more from these increases than small and medium-sized producers. The increase in product prices adversely affected the small producers who produced enough or less for themselves.

In this period, the inequality in the distribution of loans given to farmers continued to persist. Although it is stated in the development plans that medium and small agricultural enterprises that do not have sufficient credit facilities will be supported, in reality, the applied credit policy has not been in this direction. The Ziraat Bank continued to request collateral while giving loans in this period. As a result, in 1960, 88% of the farmers who were able to obtain loans received 42% of the total loans, the remaining 12% of the farmers received 58% of the total loans. This inequality deepened even more in the following years of the period. In 1975, 89% of farmers received 3% of loans, while the remaining 11% received 97%.¹¹⁰

Another important development that took place in this period was the infrastructure investments such as roads, electricity, and irrigation systems to the villages. The center-village approach, which came to the agenda with the Third Five-Year Development Plan, claims that the problems experienced in service transportation due to the scattered settlement structure in the rural area will be solved with service investments to be made in the selected central villages. For this purpose, 4.5 thousand villages in the country were selected as the center village, and investments were planned to be made in those villages.¹¹¹

¹⁰⁷ Wheat, barley, rye, tobacco, tea and sugar beet

¹⁰⁸ Wheat, barley, rye, oats, cotton, tobacco, fresh tea leaves, sugar beet, soybean, sunflower, hazelnut, pistachio, dried figs, seedless raisins, raisins with seeds, olives, poppy, rose flower, peanuts, rapeseed, olive oil, mohair, fleece and wet silk cocoon

¹⁰⁹ E. Rehber and H. Vural, **op. cit.**, p. 240

¹¹⁰ H. Albayrak, **op. cit.**, p. 123

¹¹¹ H. Albayrak, **op. cit.**, p. 123

Between 1968 and 1980, agricultural development-oriented policies were replaced by development plans implemented specifically for import substitution-oriented industrialization. The mechanization of agriculture with the Marshall Plan increased the migration from the village to the city. In 1973, for the first time, the share of the industrial sector in the GDP was higher than the share of the agricultural sector. Giving more importance to industrial development between 1968-1980 made it difficult to reach the planned targets in agriculture. As a result of the import substitution policies implemented, the agricultural sector was pushed into the background in the economy, and after this period, the share of agriculture in the economy continued to decrease.

2.4.3. 1980-2000

One of the important issues affecting agricultural policies since the establishment of the Republic of Turkey is the decisions of January 24, 1980, and the military coup of September 12, which took place in the same year. In the early 1980s, political instability continued in Turkey. This process of instability causes crises, the implementation of short-term policies, and an increase in foreign borrowing. Since the 1970s, the oil crisis, the Cyprus war, political instability, and the foreign exchange bottleneck caused stagnation in the economy. In order to overcome this, the economic decisions taken on January 24, 1980, began to be implemented.¹¹² With the January 24 Decisions, Turkey decided to follow a liberal policy. The sectors most adversely affected by the implementation of liberal policies are the developing ones that are not ready for international competition. With these policies, restrictive barriers such as import quotas in agricultural products began to be removed, and the amount of incentives and supports given to the agricultural sector decreased significantly. Domestic producers have become vulnerable to the lower prices of developed countries. It was emphasized that the agricultural sector

¹¹² Z. Akdeniz, “Agricultural Sector in Turkey and Policies in Agriculture in the 2000s”, **Istanbul University**, Master Thesis, 2019, p. 88

was an obstacle to development, especially in the 90s, with the policies created by the IMF and WB for Turkey.¹¹³

Another development that negatively affected the agricultural sector was the economic measures and implementation plan that came into effect after the crisis on April 5, 1994. With this plan, the products within the scope of support have been reduced to eight. However, the determination displayed in the April 5 package did not last long, and the total monetary amount of support purchases rose to previous levels after the crisis was over. Although intense agricultural support practices were decreased and continued until the implementation of the IMF stabilization program in 1999.

After the decisions taken in 1994, the financing of the Public Economic Enterprises and the Agricultural Sales Cooperatives by the Central Bank was prevented, and their credit privileges were abolished. By the end of the 1990s, the losses of the Public Economic Enterprises due to high borrowing rates increased to a very high level. For this reason, only half of the agricultural supports could reach the agricultural sector.¹¹⁴ In the six years following the April 5 Decisions, seven Public Economic Enterprises operating in the field of agriculture and animal husbandry were privatized. These privatized Agricultural Sales Cooperatives can be listed as Dairy Industry Corporation (1998), Feed Industry Joint Stock Company (1995), Meat and Fish Authority (2000), Forest Products Industry (2000), Turkish Agricultural Equipment Institution (2000), and Turkey Fertilizer Industry Joint Stock Company (1999).¹¹⁵

In the 1990-2000 period, Turkey experienced three substantial developments that would affect the agricultural sector. These developments can be listed as:

a) the conclusion of the Uruguay Round of the GATT and the creation of the WTO, of which Turkey is a member as of January 1, 1995,

¹¹³ R. Erbay, *op. cit.*, p. 16

¹¹⁴ A. Demirdöğen, and E. Olhan, A Brief History of Turkish Agriculture: Special Support Policy, *Journal of Agricultural Economics*, 23(1), 2007, p. 7

¹¹⁵ H. Albayrak, *op. cit.*, p. 128

b) the Customs Union Agreement signed with the EU on February 6, 1995

c) the stabilization program initiated under the supervision of the IMF after the April 1999 elections.¹¹⁶

After these developments, the “Solution Package to the Economic Crisis” was formed on 14 December 1998. This package covers policies related to minimizing government interventions in agricultural markets with the effect of the World Trade Organization Agreement and the studies to be carried out to adapt to the agricultural structure of the European Union.¹¹⁷

The Uruguay Round Agreement on Agriculture introduced liberalization in the agricultural sector worldwide. With The Uruguay Round Agreement, various regulations were made under the headings such as reducing the support given by the countries to the agricultural sector, reducing the number of subsidized exports, and reducing the measures to protect the domestic markets. While these regulations made the agriculture of underdeveloped/developing country groups foreign-dependent, they increased the efficiency of the countries with comparative advantage in the world markets.¹¹⁸

The Turkey-EU Customs Union agreement entered into force on 1 January 1996. The agreement covered only industrial products and processed agricultural products, while traditional agricultural products were excluded. With the completion of the Customs Union, Turkey abolished all customs duties and measures with equivalent effect on industrial products imported from the EU, as the EU has been unilaterally applying since 1971.¹¹⁹

Another notable change that took place between 1990 and 2000 is the stabilization program initiated under the supervision of the IMF. In the Letter of Intent dated 9 December 1999 given to the IMF, Turkey emphasized that it would

¹¹⁶ H. Albayrak, **op. cit.**, p. 131

¹¹⁷ Z. Akdeniz, **op. cit.**, p. 89

¹¹⁸ OECD, The Uruguay Round Agreement on Agriculture, 2001, (Online Access), https://read.oecd-ilibrary.org/agriculture-and-food/the-uruguay-round-agreement-on-agriculture_9789264192188-en#page1, 17.10.2021

¹¹⁹ Republic of Turkey Ministry of Foreign Affairs, Turkey-EU Customs Union, (Online Access), <https://www.mfa.gov.tr/turkiye-ab-gumruk-birligi.tr.mfa>, 17.10.2021

concentrate on agricultural reform in order to achieve the targets set within the scope of structural reforms. After this date, the steering powers of the IMF and the World Bank on Turkey's agricultural policies have increased incomparably with the past. Turkey signed an "Economic Reform Loan Agreement" with the World Bank on 27 May 2000 for 759.6 million dollars. In this agreement, there were decisions such as the transition of Turkey to the direct income support system since 2001, the reduction of fertilizer support, the reduction of agricultural credits, and the privatization of agricultural public economic organizations. Besides, the enactment of the Law on the Union of Agricultural Sales Cooperatives was the precondition for this agreement.¹²⁰

2.5. Agricultural Policies in Turkey After 2000

Agricultural policies implemented in Turkey until the end of the 1990s had a structure that did not include structural measures and was based on short-term price supports. Besides, the scopes and monetary values of the supports applied were mostly determined in line with political interests, without adapting to the developments in domestic and foreign demand. In addition, since it would not be possible to supply products to the world markets at high prices, exports had to be supported by subsidies. Finally, factors such as the burden of these policies on the budget, their weak effectiveness, increased inequality in income distribution, and insensitivity to market conditions made it necessary to carry out reforms in the agricultural sector.¹²¹

Agricultural Reform Implementation Project was signed between the World Bank and Turkey in 2000. Agricultural Reform Implementation Project, which started to be implemented in 2002, was aimed to reduce the burden of agricultural supports on the public sector budget. Besides, another aim of the project was to prevent public and private sector investments from being made according to false incentives.¹²² The agricultural reform, which has been implemented since 2002 with

¹²⁰ H. Albayrak, **op. cit.**, p. 133

¹²¹ C. Abay, **et. al.**, Change in Agricultural Policies in Turkey, VI. Turkish Chamber of Agricultural Engineers Technical Congress, 2005, p. 1, (Online Access), https://www.zmo.org.tr/yayinlar/kitap_goster.php?kodu=11, 19.10.2021

¹²² Z. Akdeniz, **op. cit.**, p. 90

the support of the World Bank, with the aim of reducing the pressure on the budget and encouraging the growth in the agricultural sector, includes three main elements. These are direct income support, the phasing out of price and input supports, reducing state intervention in the processing and marketing of agricultural products by privatizing state enterprises in agriculture.

With the policies implemented in 2002, Turkey switched to an area-based support system. In this framework, Turkey aimed to replace the price supports and input supports with direct income support. Besides, Turkey aimed to support the transition from areas that had surplus to alternative production areas and restructure the member services of Agricultural Sales Cooperatives Unions. In order to provide the necessary financing for the implementation of the project, 600 million US dollars was obtained from the World Bank in 2001.¹²³

Another significant contribution of the Agricultural Reform Implementation Project was the registration of the producers, which is necessary for the determination of the agricultural structure. With the Farmer Registration System, producers were registered on the basis of administrative units and in accordance with cadastral information. In addition, necessary information such as the size of the cultivated land and production amounts were recorded, making it easier to follow the production structure of Turkey.¹²⁴

The most significant development after the Agricultural Reform Implementation Project, which was put into effect in 2002, was the Turkish Agricultural Law, which became valid in 2006. With this law, different agricultural policy tools such as deficiency payments, compensatory payments, rural development supports, agricultural insurance supports, livestock supports, the environmentally-based agricultural land support program, and other supports were put into operation.¹²⁵

¹²³ C. Abay, **et. al., op. cit.**, p. 5

¹²⁴ T. Eğri, **op. cit.**, p. 93

¹²⁵ Z. Akdeniz, **op. cit.**, p. 92

2.5.1. The Area Based Agricultural Supports

The area-based agricultural supports can be discussed under nine subheadings. These are direct income supports, area-based additional payments (organic agriculture, good practices, soil analysis, small enterprises support), gasoline, fertilizer, certified seeds and seedlings, environment-friendly agricultural land protection, hazelnut, compensatory payments, and alternative payments.¹²⁶

Direct income support came into effect in 2000, and the first payments made under the pilot application started in 2001. The condition to benefit from direct income support payments is that the lands must be title deed and have a size of 1-500 decares. Districts within the scope of direct income support's pilot region application were Polatlı District of Ankara, Serik and Manavgat Districts of Antalya, Merkez and Kahta Districts of Adıyaman and Akçaabat and Sürmene Districts of Trabzon.¹²⁷

When we examined Table 3.2, we observed that direct income support was realized as 500 million TL in 2001. In 2008, the last year of the implementation, 1.14 billion TL was provided to producers within the scope of direct income support. The direct income supports continuing between 2001 and 2008 constituted the largest share in area-based support payments. Besides, these supports, which vary depending on the amount of land owned by the producers, negatively affected the income equality in the agricultural sector.

When we examined the diesel and fertilizer support data after 2000, we observed that these supports did not continue regularly between the years 2001-2007. The main reason for this situation was the priority given to direct income support within the scope of the Agricultural Reform Implementation Project. Diesel supports started in 2004, and between 2004 and 2019, 11.4 billion TL was paid to producers within the scope of diesel supports. Fertilizer supports, which became permanent

¹²⁶ Turkish Agriculture Law No. 5488, 2006, and Republic of Turkey Presidency of Strategy and Budget, Annual Programs

¹²⁷ Z. Akdeniz, **op. cit.**, p. 94

after 2007, amounted to 8.7 billion TL between 2001-2019.¹²⁸ Organic agriculture-good practices-soil analysis support started in 2007, and the payments made within the scope of the support were increased after 2009. On the other hand, the certified seed and seedling supports were first started in 2006, and after 2014, the payments made within the scope of the certified seeds and seedlings support were significantly increased. The main reason for the increase in the payments made within the scope of this support after 2014 was the desire to raise the production of dry pulses.¹²⁹

The aims of the Environment-Friendly Agricultural Land Protection Program can be listed as protection of natural resources such as soil and water, prevention of erosion, and reduction of the negative effects of agriculture on nature. In this context, the first support payments started in 2006, and 763 million TL was provided to the producers between 2006-2019.¹³⁰

In 2015, within the scope of the “Decree of Council of Ministers No. 8294”, the government decided to give 100 TL support per decare to the farmers registered in the Farmer Registration System, with an operating volume of 5 decares or less and growing vegetables, fruits, ornamental plants, medicinal and aromatic plants.¹³¹ The small enterprise supports have been included in the scope of area-based additional payments since 2016.

In 2016, within the scope of the “Manifesto No. 2016/29 of the Ministry of Agriculture and Forestry”, the government decided to pay 100 TL per decare to those who perform rejuvenation pruning in olive groves registered in the Farmer Registration System in the 2016 production year, excluding public institutions and

¹²⁸ Republic of Turkey Ministry of Agriculture and Forestry, (Online Access), <https://www.tarimorman.gov.tr/Konular/Tarimsal-Destekler/Alan-Bazli-Destekler/Mazot-Gubde-ve-Toprak-Analizi-Destegi>, 24.10.2021

According to the latest data published by the Ministry, gasoline and fertilizer support includes wheat, barley, rye, oats, triticale, paddy, cotton, chickpeas, dried beans, lentils, potatoes, oilseed sunflowers, soybeans, corn, onions, canola, safflower, , tea, nuts, fodder crops, and olives.

¹²⁹ Republic of Turkey Ministry of Development, Tenth Development Plan, 2013, (Online Access), <https://www.sbb.gov.tr/kalkinma-planlari/>, 24.10.2021

¹³⁰ Republic of Turkey Ministry of Agriculture and Forestry, (Online Access), <https://www.tarimorman.gov.tr/Konular/Bitkisel-Uretim/Tarla-Ve-Bahce-Bitkileri/CATAK>, 25.10.2021

¹³¹ Republic of Turkey, Decree of Council of Ministers No. 8294, 2015, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2015/12/20151216-14.pdf>, 26.10.2021

organizations.¹³² However, when we examined the budget tables, we observed that the supports started to be provided after 2018.

In 2019, within the scope of the ‘‘Manifesto No. 2019/09 of the Ministry of Agriculture and Forestry’’, the government stated that a support payment per decare would be made to the farmers registered in the Farmer Registration System, who supply organomineral fertilizers through the Fertilizer Tracking System.¹³³ In this context, these supports were included in the scope of area-based additional payments in 2019.

When we examined the annual plans, we observed that potato wart supports and tea pruning compensation, and expenses supports were provided in Turkey within the scope of compensatory payments since 2005. Before 2005, tea support was provided under the name of premium payments. Between 2001 and 2004, 175 million TL was provided for tea supports. On the other hand, in 2005, 13 million TL was provided to producers who quarantined their land due to potato warts.¹³⁴ In addition, plant quarantine support was later included in compensatory payments in 2019. Between 2006 and 2019, 1.79 billion TL was provided to the producers within the scope of compensatory payments.

The alternative payments share the same purpose as compensatory payments. Alternative supports can be defined as incentive payments for reducing the cultivation areas of products such as hazelnut, tobacco, and sugar beet, which have surplus production in Turkey in order to cultivate products such as corn, sunflower, soybean, and forage crops.¹³⁵

¹³² Republic of Turkey Ministry of Agriculture and Forestry, Manifesto No: 2016/29, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2016/08/20160804-10.htm>, 27.10.2021

¹³³ Republic of Turkey Ministry of Agriculture and Forestry, Manifesto No: 2019/46, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2019/11/20191109-2.htm>, 27.10.2021

¹³⁴ Republic of Turkey Presidency of Strategy and Budget, Annual Programs, (Online Access), <https://www.sbb.gov.tr/yillik-programlar/>, 29.10.2021

¹³⁵ H. Albayrak, **op. cit.**, p. 160

Table 2.1: The Distribution of Area Based Agricultural Supports in Turkey (current prices, million TL)

Years	Total Area Based Agricultural Support Payments	Direct Income Support Payments	Area Based Additional Payments*	Gasoline	Fertilizer	Certificated Seed and Seedling	EFALP**	Hazelnut	Alternative Payment***	Compensatory Payments****	Share of Area Based Agricultural Supports in Total Support Budget
2001	621	500	-	-	121	-	-	-	-	-	60
2002	1.877	1.877	-	-	-	-	-	-	-	-	82
2003	2.530	2.530	-	-	-	-	-	-	-	-	83
2004	2.480	2.125	-	355	-	-	-	-	-	-	80
2005	2.409	1.673	-	410	270	-	-	-	-	56	65
2006	2.759	2.653	-	-	-	37	2	-	-	67	58
2007	2.607	1.640	10	480	345	50	3	-	-	79	46
2008	2.124	1.140	-	492	352	56	5	-	-	79	36
2009	1.247	-	13	469	596	85	6	-	4	74	26
2010	2.056	-	81	512	622	90	9	652	9	81	35
2011	2.189	-	150	508	621	86	30	709	8	90	38
2012	2.379	-	172	581	695	98	17	710	1	99	31
2013	2.435	-	154	607	718	76	40	720	-	123	28
2014	2.699	-	192	646	779	118	50	788	1	125	30
2015	3.005	-	230	700	830	180	82	850	-	133	30
2016	3.304	-	321	720	880	213	135	850	-	186	29
2017	3.006	-	295	700	805	211	160	835	-	191	24
2018	4.053	-	242	1.900	553	168	139	850	-	201	28
2019	4.703	-	369	2.390	566	179	85	850	-	264	28
* Org. Farming, Good Practices, Solid Analy, Small Enterprises Support (after 2016), Rehabilitation of Traditional Olive Gardens (after 2018), Organomineral Fertilizer support (after 2019)											
** Environment Friendly Agricultural Land Protection											
*** Tobacco, and Hazelnut											
**** Potato Wart Support, Tea Trimming Support and Charges, Plant Quarantine Compensation (after 2018)											

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

2.5.2. The Deficiency Payments

Premium payments applied in Turkey are made under the name of deficiency payments in accordance with Article 9 of the Turkish Agriculture Law. The general purpose of the support is to encourage the production of agricultural products with a shortage of supply. With the developments in the agricultural sector in Turkey after 2001, sunflower, cotton, corn, soybean, and canola were included in the scope of premium payments. Later on, corn was added among these products in 2005 and safflower in 2009. Other products within the scope of deficiency payments were tea, dry pulses, and cereals. The first support for tea started in 2004, and the first support for cereals in 2005. Finally, dry pulses were included in the scope of deficiency payments after 2009.

Table 2.2: The Distribution of Deficiency Payments in Turkey (current prices, million TL)

Years	2004	2005	2006	2007	2008	2009	2010	2011
Deficiency Payments	334	897	1292	1797	1848	2007	2056	2504
Payments to Products with Supply Shortages*	294	622	1085	1273	1135	826	923	1292
Cereals and Dried Pulses (Dry Beans, Chick Peas, Lentil)	-	205	120	435	610	1068	1018	1062
Tea	40	70	87	89	103	113	115	149

Years	2012	2013	2014	2015	2016	2017	2018	2019
Deficiency Payments	2379	2607	2685	2728	3174	3888	3623	4590
Payments to Products with Supply Shortages*	1619	1240	1495	1686	2204	2516	2455	3365
Cereals and Dried Pulses (Dry Beans, Chick Peas, Lentil)	613	1197	1040	890	800	1207	998	1032
Tea	147	170	150	152	170	165	170	193

*Payments are made for cotton, olive oil, sunflower, soybeans, canola. Corn was also included in the premium after 2005. Rapeseed was also included in the premium after 2009.

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

The main factor in determining the deficiency payments is the production values. While the deficiency payments increase when the production level of a product is low, it decreases when the production level is high. With this application, 38.4 billion TL was provided to producers in Turkey between 2004-2019.

2.5.3. Livestock Support Payments

Studies on organization and animal health came to the fore in animal husbandry policies between 2000-2005 in Turkey. In 2000, the Animal Husbandry Support and Development Project was put into practice. Within the scope of this project, the Council of Ministers Decision on Supporting Livestock Breeding numbered 2000/467 came into effect. With this decision, animal husbandry support policies began to be determined by 5-year plans. The five-year animal husbandry support policies prepared since 2000 continued to be implemented annually since 2008. In addition, feed and milk supports have been reduced since 2008, and the support given per animal has started to increase.

Table 2.3 presents support provided for animal husbandry in Turkey between 2002-2019 and their share in the total agricultural support budget. Animal husbandry support, which was 75 million TL in 2002 and 3.30% of the total agricultural support budget, increased over time and reached 4.6 billion TL in 2019. The share of animal husbandry supports in the total agricultural support budget increased rapidly after 2010. Between 2002-2019, 33.08 billion TL was provided to producers within the scope of animal husbandry supports.

Table 2.3: Values and Shares of Livestock Support Payments in Turkey (current prices, million TL)

Year	Value	Share in Total Support Budget (%)	Year	Value	Share in Total Support Budget (%)	Year	Value	Share in Total Support Budget (%)
2002	75	3,30	2008	1095	18,85	2014	2685	29,35
2003	126	4,17	2009	908	19,42	2015	2973	29,81
2004	209	6,77	2010	1158	20,37	2016	3031	26,38
2005	345	9,37	2011	1728	24,85	2017	3848	30,24
2006	661	13,92	2012	2216	29,33	2018	3832	26,33
2007	741	13,33	2013	2756	31,73	2019	4693	27,65
Rural Development and Livestock Supports for the Southeastern Anatolia Project Action Plan between 2008 and 2014 are not included in the calculations.								

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

On the other hand, within the framework of the Southeast Anatolia Project Action Plan, support programs were initiated in 2009 with the aim of improving animal husbandry in the region. In this context, due to the fluctuations in the meat

and milk market, enterprises that initiated animal husbandry were supported in the Southeastern Anatolia Region. Especially in recent years, credit discounts reaching 100% were seen as a means of supporting applications in order to make animal husbandry investments attractive.¹³⁶ Within the scope of Southeastern Anatolia Project Animal Husbandry Supports, 29 million TL in 2010, 21.2 million TL in 2011, and 31 million TL in 2012 were provided to producers.¹³⁷

With the import policies that started to be implemented after 2010, the livestock sector has undergone a great change. Deciding to control the increase in the price of meat with imports this year, the government first allowed the import of live cattle for butchery. Then, imports of fatling, breeding animals, sheep, lamb, and finally carcass meat were started to be allowed respectively. Customs duties, which were 135 percent in live animal imports and 225 percent in carcass meat imports, were reduced to 0% for the tenders opened by the Meat and Fish Authority. Later, import permits began to be given to the private sector. In this context, customs duty on fatling imports was reduced to 0%. In addition, customs duties had been reduced by up to 30 percent for carcass meat and live cattle imported for butchery.¹³⁸

While imports were maintained at every stage in animal husbandry, on the other hand, the Government started the application of zero-interest loans for livestock investments through Ziraat Bank. Many entrepreneurs from the sector, who have not done animal husbandry before, have invested by taking zero-interest loans. This practice continued until the end of 2011.

2.5.4. Grants for Rural Development

According to the agricultural law that came into force in 2006, rural development supports cover all activities for the development of rural areas. Within the scope of rural development, increasing the income level of the people who live in rural areas, supporting the enterprises in order to integrate agricultural production

¹³⁶ T. Eđri, **op. cit.**, p. 130

¹³⁷ Republic of Turkey Presidency of Strategy and Budget, Annual Programs, (Online Access), <https://www.sbb.gov.tr/yillik-programlar/>, 29.10.2021

¹³⁸ Hürriyet Daily News, 2010, (Online Access), <https://www.hurriyet.com.tr/ekonomi/kucukbas-hayvan-ve-etin-gumruk-vergisi-indi-ithalat-ucuzladi-15819901>, 31.10.2021

and agriculture-oriented industry, developing the economic infrastructure, supporting the producers to use new technologies, and developing the agricultural marketing infrastructure were among the main objectives.¹³⁹

In the Eighth Five-Year Development Plan covering the years 2001-2005, rural development plans were directly included for the first time. In this plan, titles such as rural development, problems of villages and villagers, regions that should be given priority in development were examined in detail. In this context, “Decisions on Supporting Rural Development Investments” and “Manifesto on Supporting Rural Development Investments” came into force in 2006.¹⁴⁰

In 2007, Agriculture and Rural Development Support Institution was established. The purpose of this institution, which has a special budget, is to provide support to businesses operating in the agricultural field within the framework of sustainable development. In addition, the institution is a part of the IPARD program implemented together with the European Union. The IPARD program is a grant funding mechanism that aims to ensure sustainable development and raise enterprises to EU standards, taking into account the priorities and needs of Turkey in the pre-accession period. The Agriculture and Rural Development Support Institution provides 50% to 65% grant support to businesses that are targeted to be developed for this purpose. In addition, 75% of this grant support is provided from EU funds and 25% from our national funds.¹⁴¹ The enterprises included in the grant support of the Agriculture and Rural Development Support Institution can be listed as:

- a) facilities engaged in breeding animals and poultry for milk and fattening purposes,
- b) milk processing facilities and milk collection centers,
- c) slaughterhouses and meat processing facilities,
- d) cold storage facilities and aquaculture processing facilities,

¹³⁹ Z. Akdeniz, **op. cit.**, p. 133

¹⁴⁰ S. Tan, **et. al.**, Evaluation of Investment and Grant Projects Based on Agriculture within the Scope of Rural Development Supports: Aydın Province Case, C.4, S.2, ÇOMÜ **Journal of Agriculture Faculty**, Çanakkale, 2016, p. 30

¹⁴¹ Agriculture and Rural Development Support Institution, Press Briefing, 2015, (Online Access), <https://canakkale.tkd.gov.tr/Duyuru.aspx?Id=12093>, 02.11.2021

- e) beekeepers, greenhouse growers, medicinal and aromatic plant breeders,
- f) facilities producing local products such as tomato paste, pickles, and olive oil,
- g) aquaculture facilities.

Table 2.4: The Values of Grants for Rural Development in Turkey (current prices, million TL)

Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Values	80	109	247	304	249	196	478	613	627	1169	795	1397	1063

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

Table 2.4 presents the grants given for rural development between 2007 and 2019. Between 2007 and 2019, 7.3 billion TL was provided to the producers within the scope of this support.

Table 2.5 presents the grants provided to the Agriculture and Rural Development Support Institution (IPARD Agency) from the Rural Development Support Budget. Between 2007 and 2019, 1.6 billion TL was provided to Agriculture and Rural Development Support Institution. In addition, 450 million TL in 2016 and 483 million TL in 2017 were allocated to the Young Farmer Program from this budget.

Table 2.5: Grants Provided to IPARD Agency in Turkey (current prices, million TL)

Years	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Values	5,01	52,3	159	174	171	200	210	216	218	261

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

2.5.5. Agricultural Insurance Support

Natural disasters such as drought, flood, and frost are external factors that directly affect agricultural production. The decrease in producer incomes during periods of natural disasters poses a crucial risk in terms of sustainable production. In order to compensate for the falling producer incomes, the States determine the damage and make payments to the producers. For this purpose, the "Agricultural Insurance Law" numbered 5663 was enacted in 2005. The purpose of this law is to encourage producers to benefit from insurance services. In this direction, the state

covers a part of the insurance premiums of the producers.¹⁴² Agricultural insurance covers crop insurance, greenhouse insurance, animal life insurance for dairy cattle, animal life insurance for sheep and goats, poultry insurance, aquaculture insurance, and beekeeping insurance.

Table 2.6: Agricultural Crops Insurance in Turkey (current prices, million TL)

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Values	2	40	47	61	80	239	263	299	357	529	704	860	1061	1019

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

Table 2.6 presents the supports given within the scope of agricultural insurance between 2006-2019. Accordingly, we observed that the agricultural insurance support that started in 2006 increased rapidly, especially after 2010 and 2013. Between 2006 and 2019, 5.56 billion TL was provided to producers within the scope of agricultural insurance.

Table 2.7 presents the distribution of agricultural insurance supports between 2008 and 2019. The support was given between 2008 and 2010 covers crop products, greenhouses, cattle, poultry, and fishery products. Later, in 2011, small cattle and beekeeping were included in the scope of agricultural insurance. In this context, an average of 50-67% of the paid insurance premiums are covered by the state. This rate varies according to the type of products covered by the insurance.

When we examined the data for 2019, we observed that 91% of the 2.08 million insurance policies were for crop products, 7.2% for cattle and small cattle, 1.4% for greenhouse products, and the remaining 0.4% for beehives, poultry, and aquaculture. In addition, 62.4% of the insurance premiums paid for crop products, 31.9% for cattle and small cattle, 4.9% for greenhouse products, and the remaining 0.8% for beehives, poultry, and aquaculture. The distribution of the damage payments made and the total insurance costs was also similar to the distribution of the number of policies and the premiums paid. Finally, when we analyzed the premiums paid per policy, we observed that aquaculture has the highest premium value.

¹⁴² Agriculture Insurance Law, No. 5488, 2006, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2005/06/20050621-2.htm>, 04.11.2021

Table 2.7: Agricultural Insurance Activities in Turkey (2008-2019)

Insurance Line	2008				Insurance Line	2009				Insurance Line	2010				Insurance Line	2011			
	Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)
Crop	250.225	72.668.851	28.567.061	1.573.804.574	Crop	285.243	81.076.489	70.463.109	2.000.811.283	Crop	350.281	95.090.574	90.812.875	2.502.511.446	Crop	549.538	248.828.639	137.901.026	4.003.686.046
Greenhouse	2.489	3.758.149	1.114.018	315.508.650	Greenhouse	3.622	4.472.491	841.819	421.836.052	Greenhouse	3.456	5.775.840	1.757.858	414.072.957	Greenhouse	6.431	11.152.748	6.494.050	766.305.824
Cattle	8.099	20.089.686	14.386.644	264.314.417	Cattle	17.806	32.838.346	23.902.835	410.542.267	Cattle	17.200	80.763.074	28.256.701	959.597.418	Cattle	29.852	165.800.932	77.128.898	1.930.406.314
Sheep and Goats	-	-	-	-	Sheep and Goats	-	-	-	-	Sheep and Goats	-	-	-	-	Sheep and Goats	1.701	6.288.201	119.480	46.251.653
Poultry	118	760.531	33.151	25.002.594	Poultry	86	512.816	19.260	20.631.496	Poultry	159	1.283.489	17.630	44.589.963	Poultry	166	1.442.074	135.564	57.637.755
Aquaculture	13	1.166.332	-	46.341.370	Aquaculture	13	1.448.539	4.917	46.738.519	Aquaculture	20	2.520.767	554.417	67.094.745	Aquaculture	28	7.366.428	3.448.819	182.021.107
Bee Hives	-	-	-	-	Bee Hives	-	-	-	-	Bee Hives	-	-	-	-	Bee Hives	-	-	-	-
Grand Total	260.944	98.443.549	44.100.874	2.224.971.605	Grand Total	30.677	120.348.681	95.231.940	2.900.559.617	Grand Total	371.116	185.433.744	121.399.481	3.987.866.529	Grand Total	587.716	440.879.022	225.227.837	6.986.308.699
Insurance Line	2012				Insurance Line	2013				Insurance Line	2014				Insurance Line	2015			
	Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)
Crop	693.417	272.515.020	113.391.176	5.526.899.136	Crop	841.694	327.212.053	266.494.336	7.566.681.641	Crop	1.029.586	456.725.441	416.144.244	9.287.591.094	Crop	1.311.373	694.991.072	605.946.710	12.568.120.564
Greenhouse	14.244	15.529.281	15.235.538	1.328.112.314	Greenhouse	16.252	23.383.478	10.426.963	1.599.847.365	Greenhouse	16.890	28.329.138	11.106.904	1.961.150.453	Greenhouse	17.557	36.341.155	11.015.136	2.542.975.400
Cattle	29.831	169.891.684	149.216.723	2.030.980.099	Cattle	25.683	146.521.812	128.799.720	1.746.983.995	Cattle	23.320	160.443.601	98.161.562	1.950.250.230	Cattle	26.636	200.893.423	97.207.967	2.474.850.643
Sheep and Goats	6.325	25.314.809	2.244.149	195.262.420	Sheep and Goats	8.054	26.479.208	4.649.917	236.423.865	Sheep and Goats	9.815	30.396.807	6.502.720	327.908.415	Sheep and Goats	11.863	25.594.435	7.965.188	343.117.422
Poultry	196	2.466.192	34.609	94.674.861	Poultry	159	1.740.408	468.298	68.381.354	Poultry	133	1.466.076	8.095	60.033.504	Poultry	192	1.717.005	936.528	109.483.788
Aquaculture	80	13.631.886	144.512	321.547.998	Aquaculture	34	1.498.366	18.661	34.419.141	Aquaculture	44	3.139.584	185.897	66.590.225	Aquaculture	49	2.680.112	1.156.027	56.917.167
Bee Hives	-	-	-	-	Bee Hives	-	-	-	-	Bee Hives	6.824	3.035.347	175.442	241.219.825	Bee Hives	7.720	3.554.995	575.317	282.566.485
Grand Total	744.093	499.348.872	280.266.707	9.497.476.828	Grand Total	891.876	526.835.325	410.857.895	11.252.737.361	Grand Total	1.086.612	683.535.994	532.284.864	13.894.743.746	Grand Total	1.375.390	965.772.197	724.802.873	18.378.031.469
Insurance Line	2016				Insurance Line	2017				Insurance Line	2018				Insurance Line	2019			
	Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)		Number of Policies	Total Premium (TL)	Losses Paid (TL)*	Sum Insured (TL)
Crop	1.366.550	974.001.780	691.174.024	15.186.084.440	Crop	1.493.392	1.160.546.158	625.075.321	18.654.875.618	Crop	1.607.121	1.317.031.022	762.923.573	23.153.077.489	Crop	1.900.609	1.526.003.593	792.025.617	29.740.933.626
Greenhouse	19.640	47.780.675	10.968.101	3.210.687.752	Greenhouse	24.139	65.784.135	36.121.669	4.594.633.662	Greenhouse	25.208	90.744.683	33.424.966	6.547.255.347	Greenhouse	28.825	120.659.243	69.412.181	9.123.441.234
Cattle	35.777	239.537.841	128.344.181	3.496.848.720	Cattle	54.856	353.246.073	157.834.469	5.441.028.015	Cattle	90.904	567.141.646	243.697.959	9.891.882.731	Cattle	117.920	675.353.971	313.911.505	12.220.719.789
Sheep and Goats	12.026	27.591.687	8.168.647	564.161.880	Sheep and Goats	15.441	35.985.010	12.290.593	917.105.832	Sheep and Goats	21.903	58.504.227	20.847.709	1.595.868.495	Sheep and Goats	31.573	106.065.259	44.487.864	2.782.372.689
Poultry	225	1.470.483	83.669	103.658.485	Poultry	561	1.777.381	294.086	150.229.204	Poultry	696	3.468.267	882.133	283.511.665	Poultry	1.123	5.257.668	1.491.500	438.439.309
Aquaculture	61	4.054.693	1.506.182	83.436.995	Aquaculture	77	5.869.977	184.632	117.094.253	Aquaculture	107	6.974.366	1.856.590	154.207.796	Aquaculture	89	6.232.549	4.014.807	149.768.845
Bee Hives	9.998	5.549.143	718.708	435.842.005	Bee Hives	9.803	5.345.055	1.284.715	428.381.275	Bee Hives	10.489	6.770.876	1.473.105	591.737.550	Bee Hives	7.721	7.492.506	1.516.549	710.673.000
Grand Total	1.444.277	1.299.986.302	840.963.512	23.080.720.277	Grand Total	1.598.269	1.628.553.789	833.085.485	30.303.347.859	Grand Total	1.756.428	2.050.635.087	1.065.106.035	42.217.541.073	Grand Total	2.087.860	2.447.064.789	1.226.860.023	55.166.348.492

*Includes loss ascertainment expenses but excludes outstanding amounts.

Source: Compiled from Agricultural Insurance Pool Management Company, Annual Reports

2.5.6. Other Supports

Other supports included in the support given to the agricultural sector after 2000 are research and development supports, credit supports, Farm Accountancy Data Network System participation support, agricultural extension, and consultancy services support.

The Research-Development Support Program first started in 2007. This program covers the development of information and technologies needed by the agricultural sector and the improvement of research and development capacities of organizations in the agricultural sector.¹⁴³ Among the research and development support, priority is given to the development and reclamation of vegetable, fruit, and ornamental plants, development, and production of domestic varieties in cotton, oilseed, and forage plants, development of all kinds of domestic machines that increase efficiency and reduce costs in agriculture.¹⁴⁴

Within the scope of the European Union harmonization process, studies for the establishment of the Farm Accountancy Data Network System were started in 2003. Later on, the system was put into practice was 2007.¹⁴⁵ The Farm Accountancy Data Network System monitors the income and expenditure of agricultural enterprises. It is also an important informative source for understanding the impact of the measures taken under the agricultural policy. In this context, the government decided to give incentives to enterprises participating in the system in order to gather more reliable information and encourage producers to be included in the system.¹⁴⁶

Agricultural Extension and Consultancy Services Support include the support given to individuals and organizations that provide agricultural consultancy services to agricultural enterprises. Agricultural Extension and Consultancy Services Support include the support given to individuals and organizations that provide agricultural consultancy services to agricultural enterprises. The duties of

¹⁴³ Turkish Agriculture Law, No. 5488, Article 8, 2006

¹⁴⁴ Z. Akdeniz, **op. cit.**, p. 115

¹⁴⁵ T. Eğri, **op. cit.**, p. 136

¹⁴⁶ Ministry of Agriculture and Forestry, Farm Accountancy Data Network, (Online Access), <https://www.tarimorman.gov.tr/Belgeler/Duyurular/ÇMVA.pdf>, 09.11.2021

consultants, who provide consultancy services to agricultural enterprises engaged in crop and animal production, can be summarized under six articles:

- a) to carry out a survey, observation, and data collection works and to deliver the results to the provincial/district directorates,
- b) to encourage the selection of varieties suitable for the ecological structure of the region, modern irrigation systems, and alternative agricultural production, along with the use of certified seeds and seedlings, and to ensure the widespread use of sustainable and environmentally friendly agricultural methods,
- c) to inform, implement and encourage agricultural enterprises on the use of fertilizers according to the results of soil analysis,
- d) to inform the producer about the supports, loans, and grants given by the state,
- e) if there is a suitable education level, sufficient equipment, and technological infrastructure, putting earrings on the animals and entering data into the animal registration system,
- f) if there is a suitable education level, notifying the provincial/district directorate in case of an epidemic and helping to take measures such as cordon, isolation, disinfection, quarantine, and announcement.¹⁴⁷

Table 2.8 presents payments provided within the scope of other agricultural supports between 2007-2019. As we can observe in the table, between 2007 and 2019, 2.5 billion TL was provided to producers within the scope of other supports.

Table 2.8: The Values of Other Agricultural Supports in Turkey (current prices, million TL)

Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Values	26	39	175	30	42	120	109	129	109	107	133	587	904

Source: Compiled from Republic of Turkey, Presidency of Strategy and Budget, Annual Programs

¹⁴⁷ Ministry of Agriculture and Forestry, No: 2017/34, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2017/10/20171024-4.htm>, 08.11.2021

2.6. The Evaluation of Agricultural Policies Implemented in Turkey After 2000

Agriculture is a sector in which public policies are heavily used in developed and developing countries. In order to ensure the effectiveness and permanency of the interventions and supports that are going to be implemented within the sector, the agriculture and food system must be understood as a whole. Agricultural policies implemented in Turkey are generally support policies that are easy to implement, have an immediate effect, transfer income from the consumer and the budget to agriculture, and disrupt the market. Although the share of implemented policies that will affect economic growth in the long term, such as research and development, infrastructure services, extension, and marketing services, quality and standards control, and product insurance, increased in the budget after 2006, it has not reached the desired level. To maintain its comparative advantages in agriculture, Turkey needs to make extensive changes in its medium-long-term policies and build an efficiently functioning agriculture and food system in accordance with its production and resource structure.¹⁴⁸

There are also some problems in the implementation of agricultural policies, which have short-term effects on our country. Agricultural support payments, which are required to be announced at the beginning of each year in Turkey, are generally announced towards the end of the year. In addition, the Government pays agricultural subsidies with a delay of one year. This situation makes it impossible for enterprises to carry out product planning, creates an environment for uncertainty, and causes financial problems. Considering that many agricultural enterprises in our country finance their production with the loans they receive, a 1-year delay in agricultural support payments makes it difficult to repay the loans taken by the producers.

¹⁴⁸ Turkish Industry and Business Association, Agriculture and Food 2020: Analysis of Agriculture and Food Sector in the Context of Sustainable Growth, (Online Access), <https://tusiad.org/tr/yayinlar/raporlar/item/10544-tarim-ve-gida-2020-surdurulebilir-buyume-baglaminda-tarim-ve-gida-sektorunun-analizi>, 14.11.2021

2.6.1. Basin Based Agricultural Support Model

Turkey's Agricultural Basins Production and Support Model was put into practice by the Ministry of Agriculture and Forestry in 2009. In this context, the regions with similar climate, geographical conditions, and ecology, where agricultural products can be grown most economically, are divided into 30 basins. The primary purpose here is to realize production planning.¹⁴⁹

While explaining the model, Minister of Agriculture Mehdi Eker stated that agricultural production and development plans had been made only by considering geographical regions and administrative borders until today in Turkey. As a result of these plans made by only considering geographical regions and administrative borders, the supply and demand balance in the agricultural sector could not be achieved at the desired level. In this context, a production deficit or excess supply creates a burden on the Turkish economy. In addition, in our country, a lot of data on agriculture has been collected, but since these data are not used together, there have been deficiencies in the plans made. In this context, Turkey's Agricultural Basins Production and Support Model aims to identify agricultural basins, prepare a healthy agricultural inventory, make production planning in agriculture, and increase the income of the farmers. Within the scope of this plan, production pattern maps of 24 products were created according to their production intensity. These products were barley, sunflower, wheat, vetch, rye, tea, paddy, tomato, apple, beans, hazelnut, vetch, lemon, lentil, corn, cotton, potato, orange, onion, sesame, grape, clover, oat, and olive.¹⁵⁰

The implementation of the basin model first started with the “Decision Regarding the Difference Payment Support for 2010 Products According to the Production and Support Model of Turkey Agricultural Basins” published in the Official Newspaper in 2010. Within the scope of this decision, premium support was

¹⁴⁹ S. E. Yucer, et. al., Investigation of the Development of Agricultural Support Policies in Turkey in the Period of 2000-2020, **ÇOMÜ LJAR**, Vol 1(2), pp. 36-46, 2020, p.39

¹⁵⁰ A. E. Yıldırım, The Basin Model Revolution in Agriculture, Agricultural World Food, Agriculture and Livestock Platform, 2009, (Online Access), <https://www.tarimdunyasi.net/2009/07/06/tarimda-havza-devrimi/>, 23.01.2022

provided for a total of 16 products, including sunflower, cotton, soybean, canola, grain corn, safflower, olive oil, wheat, barley, rye, oats, triticale, paddy, dry beans, chickpeas, and lentils.¹⁵¹ But later on, it was understood that this decision was no different from the support premium decrees published every year. In the decree announced in 2010, there is no product included or excluded from the support premium for the first time with the basin model. In addition, in this decree, the condition that the products will receive different supports according to the basins where the productivity is high has not been fulfilled.

The National Agriculture Project, which was launched in 2017, aimed to guarantee sustainable agricultural production and food security, increase the welfare of farmers, gain more share in the global competitive environment and leave a more livable country to the next generations. The National Agriculture Project is divided into two main headings, “Domestic Production Support Model in Livestock Sector” and “Basin Based Support Model”.¹⁵² The basin-based support model, which was prepared during the period of Mehdi Eker and could not be implemented effectively between 2009 and 2016, was rearranged with the appointment of Faruk Çelik. As a result of the arrangements made, the number of basins was increased from 30 to 941.

The main objectives of the basin-based model and the scope of the products that will be supported according to this model were included in the “2018-2022 Strategic Plan of the Ministry of Agriculture and Forestry”. In this context, 21¹⁵³ products, which are strategically important and necessary for human and animal health and nutrition, have been identified in 941 agricultural basins.¹⁵⁴ In this context, it has been determined in which basins these agricultural products will be supported ecologically and economically. In addition, it was stated in this plan that the model would be minimally affected by price fluctuations caused by excess

¹⁵¹ Council of Ministers Decision, “Decision on the Difference Payment Support for 2010 Products According to Turkey's Agricultural Basins Production and Support Model”, 2010, (Online Access), <https://www.resmigazete.gov.tr/eskiler/2010/03/20100302-5.htm>, 23.01.2022

¹⁵² S. E. Yucer, et. al., **op. cit.**, p.39

¹⁵³ sunflower, rye, safflower, wheat, olive oil, barley, hazelnut, oat, lentil, corn, chickpea, paddy, triticale, dried beans, potato, canola, soybean, cotton, onion, fodder crops and tea

¹⁵⁴ Ministry of Agriculture and Forestry, 2018-2022 STRATEGIC PLAN, (Online Access), <https://www.tarimorman.gov.tr/SGB/Belgeler/2013-2017/GTHB%202018-2022%20STRATEJI%CC%87K%20PLAN.PDF>, 02.01.2022

supply. The main reason for this is that the producers will know which product is supported in which basin and the support price before they decide on production.¹⁵⁵

According to Turkey's Agricultural Basins Production and Support Model, supported products in 945 basins were determined in 2019, and support payments were paid in 2020. In 2019, the difference payment support amounts per kg for agricultural products were determined as: 0.80 TL for cotton (those who use certified domestically produced seeds), 0.40 TL for sunflower, 0.60 TL for soybeans, 0.50 TL for canola, 0.03 TL for corn, 0.55 TL for safflower, 0.80 TL for olive oil, 0.15 TL for grain olives, 0.10 TL for wheat, barley, rye, oat, triticale, paddy, 0.50 TL for dry beans, lentils, chickpeas, 0.13 TL for tea. In 2020, the difference payment support amounts per kg for agricultural products were determined as: 1.10 TL for cotton (those who use certified domestically produced seeds), 0.50 TL for sunflower, 0.60 TL for soybeans, 0.50 TL for canola, 0.03 TL for corn, 0.55 TL for safflower, 0.15 TL for grain olives, 0.80 TL for olive oil, 0.10 TL for wheat, barley, rye, oats, triticale, paddy, 0.50 TL for dry beans, lentils, chickpeas, and 0.13 TL for tea.¹⁵⁶ In addition, the Ministry of Agriculture and Forestry has been publishing lists of products that will be supported in agricultural basins annually since 2018.¹⁵⁷

¹⁵⁵ N. A. Eroğlu, et. al., Evaluation of the Basin-Based Support Policy of Turkey, **The 2nd International UNIDOKAP Black Sea Symposium on BIODIVERSITY**, Ondokuz Mayıs University, pp. 239-245, 2018, p. 241

¹⁵⁶ Ministry of Agriculture and Forestry, 2020 Annual Report, pp. 66-67, (Online Access), www.sp.gov.tr/upload/xSPRapor/files/ilHGK+Tarim_ve_Orman_Bak_2020_Yili_Faal_Rap_.pdf, 16.02.2022

¹⁵⁷ Product Lists to be Supported in the Basins in 2018, 2019 and 2020, <https://www.tarimorman.gov.tr/BUGEM/Duyuru/61/2018-Yili-Havzalarinda-Desteklenecek-Urun-Listeleri>, <https://www.tarimorman.gov.tr/Duyuru/664/2019-Yili-Havzalarinda-Desteklenecek-Urun-Listeleri>, <https://www.tarimorman.gov.tr/BUGEM/Haber/536/2020-Yili-Tarim-Havzalarinda-Desteklenecek-Urun-Listeleri>

2.6.2. Ministry of Agriculture and Forestry 2019-2023 Strategic Plan (Target and Performance Evaluation)

It is substantial that a country determines its economic aims by planning and announcing them to the public by passing them through the parliament. However, these plans must be feasible in order to achieve their objectives. In this direction, there were substantial targets related to agriculture and rural development in Turkey's 11th Development Plan.

The objectives included in the 2019-2023 Strategic Plan of the Ministry of Agriculture and Forestry can be listed as:

- 1) raising welfare in rural areas, increasing yield and quality in agricultural production, ensuring stable food supply,
- 2) ensuring food and feed security, taking necessary measures for crop and animal health and welfare,
- 3) protecting fisheries and aquaculture resources, ensuring their sustainable operation,
- 4) ensuring the sustainable management of soil and water resources,
- 5) effectively combating against climate change, desertification, and erosion,
- 6) conserving biodiversity and ensuring its sustainable management,
- 7) developing institutional capacity.¹⁵⁸

The targets and performance indicators stated in the Strategic Plan of the Ministry of Agriculture and Forestry for the years 2019 and 2020 will be examined in the tables below.¹⁵⁹

¹⁵⁸ Republic of Turkey Ministry of Agriculture and Forestry, 2019-2023 Strategic Plan (Updated Version), (Online Access), <https://www.tarimorman.gov.tr/SGB/Belgeler/stratejikplan.pdf>, 17.02.2022

¹⁵⁹ Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version), (Online Access), [www.sp.gov.tr/upload/xSPRapor/files/ilHGK+Tarim ve Orman Bak 2020 Yili Faal Rap .pdf](http://www.sp.gov.tr/upload/xSPRapor/files/ilHGK+Tarim+ve+Orman+Bak+2020+Yili+Faal+Rap+.pdf), 17.02.2022, [www.sp.gov.tr/upload/xSPRapor/files/tII7c+Tarim ve Orman Bakanligi 2019 Yili Faaliyet Rapor u.pdf](http://www.sp.gov.tr/upload/xSPRapor/files/tII7c+Tarim+ve+Orman+Bakanligi+2019+Yili+Faaliyet+Raporu.pdf), 17.02.2022

Table 2.9: Targets and Performance Indicators Related to Providing Supply Security in Crop Products and Developing New Varieties, Methods, and Technologies

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of new plant varieties registered (unit)	1.460	1.470	1.277	1.480	1.555	The decrease in registration and production permit applications by private sector organizations operating in the field of seed production and the revision work in the "Regulation on the Protection of Breeder's Rights Belonging to New Plant Varieties" were shown as the reason for the failure to reach the target in 2019. On the other hand, the target was achieved in 2020.
Improvement and management area of pastures (Decare) (Cumulative)	9.500.000	10.000.000	10.080.609	10.500.000	12.630.592	The targets for 2019 and 2020 have been achieved. However, the biggest risk in maintaining performance indicators is a lack of resources. In order to prevent this, it was emphasized that the projects should be prepared and implemented with lower costs.
Annual production of oilseed crops (tons)	4.009.495	4.278.185	3.986.000	4.415.245	3.684.674	The main reason for not achieving the determined targets is the decrease in the production amount of oilseed crops depending on the climatic conditions. In order to solve this problem, they should give the necessary attention to the development of varieties, methods, and technologies that are resistant to climate and environmental factors.
Number of cultivars to be developed for crop production (Cumulative)	68	147	165	197	274	The targets for 2019 and 2020 have been achieved. In 2020, more than expected performance was achieved due to increasing R&D activities.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.10: Targets and Performance Indicators Related to Providing Supply Assurance in Animal Products and Developing New Breeds, Methods, and Technologies

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Annual amount of milk supplied to industry (in tons)	9.200.000	9.307.000	9.560.354	9.493.000	9.841.522	The targets for 2019 and 2020 have been achieved. In this direction, the government aims to record milk production and ensure sustainability in production.
Annual red meat production (in tons)	1.118.695	1.250.000	1.201.469	1.400.000	1.450.000	In 2019, the target was largely achieved. It was stated that the high increase in 2020 was due to the introduction of interest-reduced livestock loans.
Ratio of Culture Breeds in Cattle (%)	49	50	48,39	51	49,2	The target has been achieved to a large extent, and it has been evaluated that artificial inseminations will turn into pure culture breeds after three generations.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.11: Targets and Performance Indicators Related to Developing Appropriate Policy Tools for a Highly Competitive and Sustainable Agricultural Sector

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of Specialized Organized Industrial Zones Based on Agriculture (Cumulative)	5	6	6	7	7	The targets have been achieved. The primary purpose of the establishment of these industrial zones is the development of agriculture-industry integration and cooperation.
Number of agricultural insurance policies per year	1.756.428	1.850.000	2.087.860,00	2.000.000	2.235.626	It has been stated that the determined target has been achieved since the demand distribution area has expanded in proportion to the expansion of the risk coverage of state-supported agricultural insurances.
Number of producer organizations for which awareness-raising and strengthening activities are carried out (Cumulative)	80	93	93	128	128	The targets for 2019 and 2020 have been achieved.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.12: Targets and Performance Indicators Related to Developing Training Strategies and Consultancy Systems for Producers and Consumers

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of agricultural consultants attending trainings (Cumulative)	100	330	452	480	524	The target was exceeded due to the higher demand for training within the scope of the protocol signed with producer organizations and the intense interest in the IPARD II Capacity Building Technical Assistance Project.
Number of enterprises receiving agricultural consultancy services (Cumulative)	55.000	59.445	59.445	70.000	66.733	The target was reached in 2019. On the other hand, the target was not reached in 2020.
Number of TV programs with agricultural content (Cumulative)	200	405	405	615	615	The targets for 2019 and 2020 have been achieved.
Number of women trained in agricultural and household economics (Cumulative)	88.906	135.000	140.480	135.000	553.140	Due to the Covid-19 pandemic in our country in 2020, training programs have started to be given remotely. This situation increased the interest in training programs by the farmers and caused a positive deviation from the target.
The annual number of certificates/certificates given as a result of training programs within the scope of Agricultural Population Getting Younger and Herd Management Personnel Projects	26.000	26.050	30.987	26.100	6.725	The target was achieved in 2019. However, in 2020, the target could not be reached due to the Covid-19 pandemic.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.13: Targets and Performance Indicators Related to Increasing the Efficiency of Food and Feed Official Control Services

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of production sites with pesticide control before harvest (Cumulative)	18.036	35.000	36.206	53.500	54.386	In 2019, a pesticide control program was carried out in the pre-harvest period on a risk basis at 18.170 production sites. In this context, penalties were applied on producers who were found to be unfavorable, and necessary measures were taken before the products were sent to the market. Despite the pandemic process in 2020, the work continued, and the target was achieved.
Number of annual official controls in food related-businesses	1.124.918	1.200.000	1.215.996	1.300.000	1.356.643	The targets for 2019 and 2020 have been achieved.
Number of annual official controls in feed-related businesses	20.000	40.500	50.777	61.500	78.746	The targets for 2019 and 2020 have been achieved.
The number of cross-official controls and inspections of official controls between provinces on a yearly basis	631	5.000	5.131	6.000	978	The target was reached in 2019. But the travel bans implemented in 2020 due to the Covid-19 pandemic caused a deviation from the target.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.14: Targets and Performance Indicators Related to Providing Accurate and Up-to-Date Information on Food Safety and Developing Practices for Food Safety

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Total number of scientific opinions generated after risk assessment (Cumulative)	15	30	24	50	26	Due to the Covid-19 pandemic, Scientific Commission meetings could not be conducted. Therefore, the targets were not achieved.
Number of people trained each year on food safety	140.074	110.000	206.640	130.000	42.400	The target was successfully achieved in 2019. However, in 2020, the target could not be reached due to the Covid-19 pandemic and the restrictions applied afterward.
Ratio of the number of inspectors who carry out official inspections and training in food establishments to the total number of inspection officers (%)	24,5	20	20	20	8,8	While reaching the target in 2019, Covid-19 measures in 2020 caused a serious change in the environment. Therefore, the planned training programs could not be conducted in 2020.
Number of certificates/documents given as a result of training programs on hygiene in the milk industry (Cumulative)	750	1.750	2.186	2.760	3.655	The targets have been achieved. The demand for the training programs has increased because the people involved in the milk supply want to have a certificate for reasons such as job opportunities or the expectation of benefiting from new supports

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.15: Targets and Performance Indicators Related to Monitoring the Stock Status of Fish Species and Preparing Management Plans

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of species whose management plan was prepared and monitored (Cumulative)	1	2	2	3	3	The targets for 2019 and 2020 have been achieved.
Number of species whose biological data were collected (Cumulative)	2	3	3	3	3	The targets for 2019 and 2020 have been achieved. Within the scope of the National Fisheries Data Collection Programme; Height and weight measurements of Anchovy, Sardine, and Bluefish were made.
Number of commercially caught fish species whose annual stocks are determined	5	5	5	5	5	The targets for 2019 and 2020 have been achieved. The Ministry of Agriculture and Forestry organizes two sea voyages a year with acoustic devices on research ships and monitors the stock of 5 fish species (anchovy, horse mackerel, bonito, bluefish, and sprat).

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.16: Targets and Performance Indicators Related to Increasing the Effectiveness of Inspections to Protect Fishery Products and Resources

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of inspections for fishing vessels (Cumulative)	86.000	173.000	195.339	261.000	368.756	The targets for 2019 and 2020 have been achieved.
Number of inspections in aquaculture facilities (Cumulative)	5.000	10.500	10.500	16.500	16.500	The targets for 2019 and 2020 have been achieved.
Number of newly constructed fishery administrative buildings (Cumulative)	51	54	53	55	54	Due to the delays in the construction, the targets could not be reached.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.17: Targets and Performance Indicators Related to Increasing Fisheries Production

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of aquaculture areas whose carrying capacity is determined in seas or inland waters (Number) (Cumulative)	28	30	30	32	32	The targets for 2019 and 2020 have been achieved. Artvin, Giresun, Ordu, and Trabzon provinces have been determined as new aquaculture areas in the sea area.
Number of fish released into water resources (Number) (Cumulative)	6.000.000	12.100.000	12.284.000	18.300.000	19.496.000	The Fisheries Research Institute, which produces carp within the scope of the project, had a productive production period in 2019 and 2020. In addition, the targeted amount was exceeded due to the production of catfish, sea bass, bream, rock bass, and white grouper.
Number of international projects collaborated (Cumulative)	2	2	2	3	3	The targets for 2019 and 2020 have been achieved.
Number of events held with international institutions and organizations on the aquaculture sector (Cumulative)	20	42	42	67	67	The targets for 2019 and 2020 have been achieved.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.18: Targets and Performance Indicators Related to Controlling the Negative Effects of Flood and Drought

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of basins whose flood management plan has been completed (Cumulative)	5	16	16	23	23	The targets for 2019 and 2020 have been achieved. The preparation of the Fırat-Dicle, Van Lake, Konya, Asi, Seyhan, Çoruh, and Eastern Black Sea Basins Flood Management Plans were completed by the end of 2020.
Number of basins whose drought management plan has been completed (Cumulative)	9	15	15	17	15	While reaching the target in 2019, the Drought Management Plans of the 2 basins planned to be made in 2020 were postponed to be completed in the next period.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.19: Targets and Performance Indicators Related to Ensuring the Protection and Efficient Use of Soil and Water Resources

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Land use planning area (hectares) (Cumulative)	163.878	163.878	163.878	244.000	0	The target was achieved in 2019. However, due to the Covid-19 pandemic conditions in our country and the lack of financial support for the project, field and laboratory sampling studies could not be started in 2020.
Area with detailed soil survey (hectares) (cumulative)	237.543	288.000	237.543	1.228.800	0	Studies started in 2019, but the target was not reached. Due to the Covid-19 pandemic conditions experienced in our country in 2020 and the lack of financial support for the project, field and laboratory sampling studies could not be started.
The rate of analysis at stations where nitrate monitoring is performed in surface and underground waters (%)	95	90	93	90	92	The targets for 2019 and 2020 have been achieved.
Number of certificates/certificates given as a result of pressure irrigation, effective and efficient irrigation systems trainings (Cumulative)	1.000	2.100	1.727	3.300	3300	The target was not reached in 2019. The main reason for this is that farmers did not participate in training programs. Harvest flocks of the crops were ignored while preparing the training programs. In addition, the participation rates of the farmers who are members of irrigation cooperatives and irrigation unions in the training programs are not sufficient.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.20: Targets and Performance Indicators Related to Making Holistic Plans in Line with EU Legislation in Order to Protect the Quantity and Quality of Water

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of drinking water basins with a conservation plan (Cumulative)	15	16	16	17	18	The targets for 2019 and 2020 have been achieved. Çamlıdere Dam and Gerede Işıklı Regulator Basin Protection Plans were completed in 2020.
Number of basins with sectoral water allocation plan (Cumulative)	3	5	5	5	6	The targets for 2019 and 2020 have been achieved. Sectoral Water Allocation Plans for Akarçay, Konya, Seyhan, Gediz and Küçük Menderes Basins were completed in 2020.
Number of basins for which river basin management plan is made (Cumulative)	5	8	7	11	8	The targets for 2019 and 2020 have been achieved.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.21: Targets and Performance Indicators Related to Protecting Genetic Resources, Ensuring Their Sustainable Use

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of animal breeds kept alive in the hands of the public and in Research Institutes (Cumulative)	25	25	25	25	25	The targets for 2019 and 2020 have been achieved.
The rate of increase in the protected plant sample in field and seed gene banks (%)	1,24	0,50	3,36	0,50	8,93	The targets for 2019 and 2020 have been achieved.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

Table 2.22: Targets and Performance Indicators Related to Protecting Genetic Resources and Ensuring Their Sustainable Use

Performance Indicators	2018	2019 (Target)	2019	2020 (Target)	2020	Explanation
Number of provinces where traditional biodiversity-based information is determined (Cumulative)	7	12	12	21	21	The targets have been reached. Performance indicator values have been reached with the completion of field studies in Bursa, Mersin, Kayseri, Gümüşhane, Şanlıurfa, İzmir, Kırklareli, Trabzon, Van, Isparta, Sinop, Bartın, Aksaray and Mardin provinces in 2019 and 2020.
Number of education programs organized in schools on biodiversity (Cumulative)	4.945	6.295	6.302	7.695	6.602	The target was achieved in 2019. However, due to the global-scale COVID-19 epidemic, the target could not be reached in 2020.
Number of people trained in hunting (Cumulative)	128.000	138.000	149.000	148.000	164.339	The targets have been achieved. In 2019, 917 hunter training courses were opened, and 20.924 hunter candidates who were successful in these courses were given hunter training certificates.
Number of sector-specific impact and assessment reports on nature protection (Cumulative)	400	700	750	1.000	1.055	The targets have been achieved. A total of 350 reports were evaluated in 2019, and 305 reports were evaluated in 2020. There was a positive deviation from the 2020's target due to the high number of applications in the energy and mining sectors.

Source: Republic of Turkey Ministry of Agriculture and Forestry, 2020 Annual Report, 2019 Annual Report, 2019-2023 Strategic Plan (Updated Version)

CHAPTER THREE

THE ANALYSIS OF TURKEY'S TRADE COMPETITIVENESS IN SELECTED AGRICULTURAL PRODUCTS

In this part of the study, generally, we will analyze the trade competitiveness of the selected agricultural product groups in Turkey between the years 2009-2020 using the RCA, RTA, RC, LNRXA indices in the world market. In addition, we will use the TBI index to examine Turkey's foreign trade balance in the analyzed product groups. In this context, first, we will discuss the theoretical background of competitiveness. Second, we will mention the studies conducted in the domestic and foreign literature related to the calculation of trade competitiveness. Third, we will give information about the data and method used in our analyses. Fourth and lastly, the results of the trade competitiveness analyses will be evaluated.

3.1. Theoretical Background

A significant amount of research has been carried out to improve the understanding of competitiveness in the economy. However, the term “competitiveness”, which does not have a standard definition, focuses more on the measurement method in the literature.

3.1.1. The Definition of Competitiveness

“The term originated from the Classical Latin word “petere” meaning to seek, attack, aim at, desire, and the Latin prefix “con-” meaning together. At present, it is often used in different contexts, meaning different things to different researchers”.¹⁶⁰ Originating from the Latin word “competer”, the roots of competitiveness lies in international economic theories of the eighteenth century. Although research on competitiveness has been popular for fifty years, it is clear that the number of studies evaluating many economic phenomena according to whether they are competitive or not has increased rapidly in recent years. However, although

¹⁶⁰ T. Siudek, A. Zawojcka, Competitiveness in the Economic Concepts, Theories and Empirical Research, **Warsaw University of Life Sciences, Oeconomia**, Vol.13 (1), 2014, 91–108, p. 91

the number of these studies, in which competitiveness is analyzed at different (macro and micro) levels, has increased, there are still problems in its measurement as well as in understanding its meaning.

Table 3.1: The Definitions of Competitiveness According to Various Authors

Author [year]	Definition
Adamkiewicz-Drwillo [2002]	A company's competitiveness means adapting its products to market and competitive requirements, especially in terms of product range, quality, price, and optimal sales channels and promotion methods.
Altomonte et al. [2012]	International competitiveness is the ability to exchange goods and services that are abundant in one's home country for goods and services that are scarce in that country.
Ajitabh, Momaya [2004]	The competitiveness of a firm is its share in the competitive market.
Barker, Köhler [1998]	Competitiveness of a country is the degree to which it can sustain and expand the real incomes of its population in the long run, while producing goods or services that meet the demand of international markets, under free and fair market conditions.
Bobba et al. [1971]	Competitiveness is the ability of nations, regions, and companies to create wealth, which is a prerequisite for high wages.
Buckley et al. [1988]	A firm's competitiveness means its ability to produce and sell products and services of superior quality and lower costs than its domestic and international competitors. Competitiveness is a firm's long-run profit performance and its ability to compensate its employees and provide superior returns to its owners.
Chao-Hung, Li-Chang [2010]	A firm's competitiveness is its economic strength against its rivals in the global marketplace where products, services, people, and innovations move freely despite geographical boundaries.
Domazet [2012]	Competitiveness is the ability of firms to consistently and profitably produce products that meet the requirements of an open market in terms of price and quality.
European Commission [2001]	A nation's competitiveness is the ability of an economy to provide its population with high living standards and high employment rates on a sustainable basis.

Flejterski [1984]	Competitiveness is the capacity of the sector, industry, or branch to design and sell its goods at prices, quality, and other features that are more attractive than the parallel characteristics of the goods offered by the competitors.
Kim, Marion [1995]	Competitiveness is the sustained ability of a nation's industries or firms to compete with foreign counterparts in foreign markets as well as in domestic markets under conditions of free trade.
Krugman [1990, 1994]	If competitiveness has any meaning, it is simply another way to express productivity. An ability of a country to improve its living standard depends almost entirely on its ability to raise its productivity. Competitiveness is a meaningless word when applied to national economies.
Porter [1990]	The only meaningful concept of competitiveness at the national level is national productivity. Competitiveness is an ability of an economy to provide its residents with a rising standard of living and high employment on a sustainable basis.
Porter et al. [2008]	The most intuitive definition of competitiveness is a country's share of world markets for its products. This situation makes competitiveness a zero-sum game because one country's gain comes at the expense of others.
Scott, Lodge [1985]	National competitiveness is a country's ability to create, produce, distribute, and/or service products in international trade while earning rising returns on its resources.
Sharples, Milham [1990]	An ability to deliver goods and services at the time, place, and form sought by overseas buyers at prices as good or better than those of other potential suppliers whilst earning at least opportunity costs returns on resources employed.
Tyson D'Andrea [1992]	Competitiveness is our ability to produce goods and services that meet the test of international competition while our citizens enjoy a standard of living that is both rising and sustainable.
Wijnands et al. [2008]	Competitiveness is the ability to produce products, and services that people will purchase over those of competitors.

World Economic Forum – WEF [1996]	Competitiveness is an ability of a country to achieve sustained high rates of growth in GDP per capita.
World Economic Forum – WEF [2015]	Competitiveness is the set of institutions, policies, and factors that determine the level of productivity of a country.

Source: Compiled from T. Siudek, A. Zawajska, COMPETITIVENESS IN THE ECONOMIC CONCEPTS, THEORIES AND EMPIRICAL RESEARCH, **Warsaw University of Life Sciences, Oeconomia**, Vol.13 (1), 2014, 91–108, p. 93, and A. Jambor, S. Babu, **Competitiveness of Global Agriculture, Policy Lessons for Food Security**, SPRINGER, 2016, pp. 26-27

Competitiveness has been defined by various authors as a theoretical, multidimensional, and relative concept. These definitions differ according to national, regional, industrial, sectoral, and individual enterprises. It also presents itself as a confusing term used almost interchangeably with other concepts such as productivity, innovation, or market share.¹⁶¹ Competitiveness at the firm level is closely related to the long-run profit performance of the firm and higher return on investment for owners. On the other hand, competitiveness at the national level is based on superior productivity performance and the economy's ability to shift output to high productivity activities which in turn can generate high levels of real wages.¹⁶² In this context, we demonstrated various author's definitions of competitiveness according to different micro-macro scales in Table 3.1.

3.1.2. Theories on Competitiveness

In this part of the study, the development of traditional and modern competitiveness theories at micro and macro levels will be examined.

3.1.2.1. Traditional Approaches to International Competitiveness

International trade theories form the foundation of competitiveness at the macro level. However, in classical foreign trade theories, the concept of "competition" is not included separately. In this context, the development of foreign

¹⁶¹ T. Siudek, A. Zawajska, **op.cit.**, pp. 91-92

¹⁶² A. Jambor, S. Babu, **Competitiveness of Global Agriculture, Policy Lessons for Food Security**, SPRINGER, 2016, pp. 26-27

trade theories in the historical process has indirectly contributed to the development of competitiveness. The first study to explain the causes for the free entry of countries into international trade is based on Adam Smith's theory of absolute advantage, developed in 1776. After Smith, the pioneer of classical approaches, Ricardo and Heckscher, and Ohlin's theorems tried to explain international competitiveness.

3.1.2.1.1. Absolute Advantage Theory

The theory of absolute advantage was put forward by Adam Smith. Adam Smith argued in his book “The Wealth of Nations” that liberalization of trade would increase the welfare of countries. In this context, Smith tried to explain international trade with a scientific method and brought the Absolute Advantage Theory to economic literature. In addition, in this study, he criticized mercantilism and argued that the source of wealth in a country is not limited to gold and silver.¹⁶³

A. Smith, who attaches great importance to the division of labor and specialization, stated that international trade is obligatory because countries cannot produce everything. Therefore, according to Smith's theory, countries should never attempt to produce a good that they can import more cheaply from abroad. From this point of view, countries should develop a division of labor and specialization. Thus, countries will be able to realize foreign trade at the same time as their natural development and get the maximum benefit from foreign trade.¹⁶⁴

Adam Smith explained the Absolute Advantage Theory under the assumption that the market in which only two goods are produced under free-market conditions and these products produced in a world with two countries.¹⁶⁵ According to the theory, in a world with two goods and two countries, whichever country produces a good more cheaply should specialize in the production of that good and export it, and import the goods that it produces more expensively from the other country. Thus,

¹⁶³ R. Karluk, **International Economics**, Beta Publishing, 10th Edition, 2002(b), p.12

¹⁶⁴ M. B. Özdemir, Competitiveness Analysis of Turkey's Selected Agricultural Products by Revealed Comparative Advantages Method, **Süleyman Demirel University**, PhD Thesis, 2018(b), p. 14

¹⁶⁵ H. Tunç, **International Trade, Money and Finance**, Sümer Publishing House, 2nd Edition, 2014, p. 12

both countries will benefit from foreign trade. The basis of the theory of absolute advantage lies in the specialization and division of labor. As a result of specialization, resources are used in the most effective way, thus increasing the welfare of countries and the world.¹⁶⁶ But according to this theory, trade does not take place when a country has an absolute advantage in both goods.

The theory of absolute superiority is accepted as the first step in scientifically explaining the reason for international trade. However, this theory could only explain a limited part of international trade, such as trade between developed and underdeveloped countries. In addition, this theory falls short of explaining the trade between developed countries.¹⁶⁷ Later, these views of Smith were reexamined and redeveloped by David Ricardo nearly 40 years later.

3.1.2.1.2. Comparative Advantage Theory

The Theory of Comparative Advantage was put forward by David Ricardo. This theory was included in D. Ricardo's book called “Principles of Political Economy and Taxation” in 1817. D. Ricardo, in this study, states that, unlike A. Smith, a country does not need to have an absolute advantage over another country in order to carry out international trade.¹⁶⁸ “The foundation of this theory, originally put forward by Torrens, was based on the free trade of goods whose production would benefit the country. David Ricardo expressed this idea mathematically. Later, Mill reconsidered the theory in the context of political economy”.¹⁶⁹

D. Ricardo explained the Theory of Comparative Advantage under the assumption that the market in which only two goods are produced under free-market conditions and these products produced with homogeneous labor in a world with two

¹⁶⁶ Z. C. Miral, Revealed Comparative Advantages and Turkey's Competitiveness Against the European Union: An Application for Selected Agricultural Products, **Dokuz Eylül University**, Master Thesis, 2006, p. 13

¹⁶⁷ N. Eruygur, Analysis of the Competitiveness of the Turkish Agriculture Sector Against the European Union Using the Revealed Comparative Advantages Method, **Zonguldak Bülent Ecevit University**, Master Thesis, 2019, p. 10

¹⁶⁸ H. Tunç, **op. cit.**, p. 15

¹⁶⁹ M. B. Özdemir, **op.cit.**, p. 15

countries.¹⁷⁰ Ricardo developed the theory of comparative advantage based on the shortcomings of the theory of absolute advantage. According to this theory, the reason why nations trade with each other is the comparative advantage one country has over another in the production of a good. In this context, differences in production technology are the basis of comparative advantage. Therefore, production and trade are driven not by low production costs but by the most efficient use of resources.

D. Ricardo argues that even if a country is more productive in absolute terms, it should only specialize in products for which it has a comparative advantage.¹⁷¹ In addition, if the country has the absolute disadvantage in the production of both goods, it should produce and export the good that it has a less absolute disadvantage. In this way, the country will have a comparative advantage in one of the two goods. As a result, there will be an increase in national and world production in each good, and both countries will benefit from the trade. In addition, thanks to the effective use of resources, productivity and welfare will be increased.¹⁷²

3.1.2.1.3. Factor Endowment Theory

Heckscher in his article *The Effect of Foreign Trade On The Distribution of Income* published in 1919, and Bertil Ohlin in his book *Interregional and International Trade* published in 1933, explained foreign trade.¹⁷³ Heckscher and Ohlin stated that production functions of goods differ between countries. Factor Endowment Theory, which aims to eliminate the deficiencies of the comparative advantages approach, indicated that in addition to the labor factor on which Ricardo's theory is based, capital is also a factor affecting foreign trade. In the Factor Endowment Theory, as in Ricardo's Theory of Comparative Advantage, it is stated that each country should specialize in certain goods in order to export it. On the other

¹⁷⁰ H. Tunç, **op. cit.**, p. 15

¹⁷¹ A. Jambor, S. Babu, **op.cit.**, p. 31

¹⁷² H. Tunç, **op. cit.**, p. 16

¹⁷³ N. Eruygur, **op.cit.**, p .10

hand, it was stated that the country should prefer to import goods that it will produce relatively more expensively.¹⁷⁴

The explanation of factor endowment theory is made under the assumption that countries differ from each other in terms of their production factors. Besides, factor endowment theory states that the labor and capital intensity used in the production of goods can vary. According to the theory, whichever factor of production a country has more, it specializes in the production of goods in which that factor can be used more intensively. With this specialization, the export of the products of which production is preferred will increase. Therefore, the demand and price for the production factors used for these exported goods will also increase.¹⁷⁵

On the other hand, the production of goods for which the country's production factors are fewer will be abandoned. In this context, these products which decided not to produce will be imported. As a result, the demand and price for the factors used in the production of imported goods will decrease. In other words, as a result of foreign trade, while the price of the factors that countries have in abundance rises, the price of the scarce factors decreases. Thus, factor prices between countries are relatively equalized.¹⁷⁶

“Factor Endowment Theory states that the liberalization of foreign trade contributes positively to the income distribution due to the relatively abundant labor factor in developing countries.”¹⁷⁷ To summarize, according to this theory, labor-rich countries will export labor-intensive goods and import capital-intensive goods in return. On the other hand, capital-rich countries will export capital-intensive goods and import labor-intensive goods in return.

3.1.2.2. Modern Approaches to International Competitiveness

The inadequacy of traditional approaches in explaining the concept of competitiveness and its determinants has led to the emergence of modern

¹⁷⁴ R. Karluk, *op.cit.*, pp. 32-33

¹⁷⁵ Z. C. Miral, *op.cit.*, pp. 15-16

¹⁷⁶ *Ibid.*

¹⁷⁷ M. B. Özdemir, *op.cit.*, p. 17

approaches. While the traditional theories explain the concept of competition on the basis of the absolute and comparative advantages of the countries, modern theories take into account all the dynamics of the factors of production. In this context, with the developing technology over the years, the concept of competitiveness has also changed. In particular, new factors such as product differentiation and service quality have started coming to the fore. In this direction, modern approaches that aim to explain competitiveness will be examined in this part of the study.

3.1.2.2.1. Porter's Theory of Competitiveness - Diamond Model

According to Porter's approach, countries can create unique factor pools such as skilled labor, high technology, accumulation of knowledge, and culture. At this point, the internal dynamics of the countries are of great importance in gaining competitive power. In this context, the structure of the country could create an environment suitable for the development of local industries and provide a competitive advantage to its companies. The main factor here is that the country should provide support to the development of industry, not directly to the companies. Affected industries will ultimately affect companies positively in terms of competitiveness..¹⁷⁸ “According to this theory, competitiveness depends on long-term productivity, and long-term productivity requires a business environment that supports continuous innovation in products, processes, and management”..¹⁷⁹

Michael E. Porter (1980, 1985, 1986, and 1990) has examined over 100 sectors for ten countries in his studies. Porter (1990) explains the reasons why a country succeeds in some industries and fails in others with the Diamond Model he developed. Porter's model examines national competitive advantage under four groups as (1) factor conditions, (2) demand conditions, (3) related and supporting

¹⁷⁸ M. B. Özdemir, **op.cit.**, p. 19

¹⁷⁹ T. Siudek, A. Zawojńska, **op. cit.**, p. 95

industries, and (4) firm structure, strategy, and rivalry. In addition, the government and chance factors are considered as other factors affecting the model.¹⁸⁰

Factor Conditions

“Contrary to classical trade theories that define factor conditions as land, labor, and capital, Porter categorizes factor conditions as human resources, physical resources, information resources, capital resources, and infrastructure owned by the nation”.¹⁸¹ For example, if a country has a largely uneducated workforce, the products produced by that country will be labor-intensive. On the other hand, if the country's workforce has higher education, the products, and services generated in that country will reflect the capacities of educated people.¹⁸²

Demand Conditions

Porter emphasized that the strong and conscious domestic demand for the product or service produced by the companies is significant in terms of the competitive advantages of the nations. In this context, the existence of strong and conscious domestic demand provides firms with information about the consumption habits of society and expectations of society. Besides, it facilitates companies to adapt more quickly to the changes occurring in the consumption habits of consumers and the expectations of society. “In this direction, as the awareness level of society increases, a company that can adequately respond to their demands will have a higher chance of gaining competitive power in the international environment”.¹⁸³

Related and Supporting Industries

According to Porter, the third factor that ensures the competitive advantage of nations is the existence of related and supporting industries that also have competitive power. In this direction, ensuring cooperation and information flow

¹⁸⁰ M. Koç, O. B. Özbozkurt, An Evaluation of the Competitive Advantage of Nations and the Diamond Model, **Journal of Business and Economic Studies**, Volume 2, Number 3, 2014, pp.85-91, p. 86

¹⁸¹ N. Eruygur, **op.cit.**, pp. 13-14

¹⁸² M. Koç, O. B. Özbozkurt, **op.cit.**, p. 88

¹⁸³ **ibid.**

between interconnected industries significantly affects the competitiveness of the sectors and, accordingly, the exporting ability.¹⁸⁴

Firm Structure, Strategy, and Rivalry

In addition to the environment factor in which the firm emerges, organizes, and manages as the fourth power in the Diamond Model, another determinant is the nature of the local competition conditions. According to Porter, the competitiveness strategies of firms can be affected by regional conditions. In this context, a weak competition environment is a factor that makes a sector attractive for new investments. However, in industries where regional competition is strong, companies will ensure the development of the industry by innovating.¹⁸⁵

Government

“Porter defines the role of the government as an external factor that indirectly affects competitiveness. In order to increase or protect the competitiveness of the companies, the government implements the necessary measures in case of new opportunities, changing conditions, or crises”.¹⁸⁶

Chance

All events that cannot be controlled by humans or affect the industry and change conditions of firms in the competitive environment are considered chance factors.

“According to Porter's Diamond Model, the competitive advantage of firms is shaped by the country's international competitiveness. In other words, comparative advantage indicates whether a firm or a country has the potential to compete, and competitiveness indicates whether this potential is realized”.¹⁸⁷

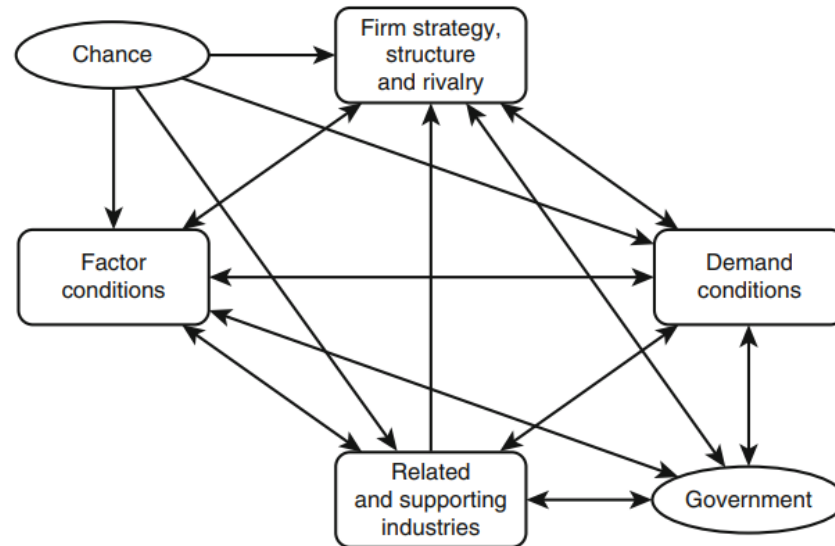
¹⁸⁴ M. Koç, O. B. Özbozkurt, **op.cit.**, pp. 88-89

¹⁸⁵ M. B. Özdemir, **op.cit.**, p. 21

¹⁸⁶ Z. C. Miral, **op.cit.**, p. 22

¹⁸⁷ A. Jambor, S. Babu, **op.cit.**, p. 33

Figure 3.1: Porter's Diamond Model – The Determinants of National Advantage



Source: A. Jambor, S. Babu, Competitiveness of Global Agriculture, Policy Lessons for Food Security, SPRINGER, 2016, p. 33

3.1.2.2.2. Krugman's Theory of Competitiveness

Krugman defines competitiveness as raising the standard of living of a country while maintaining its foreign trade balance. In this context, according to Krugman, there is competition between companies, not between countries. In the competition between firms, the success of one leads to the failure of the other. On the other hand, according to Krugman, international trade is not a zero-sum game hence a win-win situation can also happen unlike in business.¹⁸⁸

Also, according to Krugman, productivity growth is the primary driver of competitiveness, and the international competitiveness of countries is associated with high living standards. In addition to this, Krugman argues that countries should be compared with their productivity rather than their global competitiveness. According to Krugman, it is wrong to measure competitiveness by using a country's trade balance. In this context, Krugman states that in theory and practice, a trade surplus

¹⁸⁸ P. Krugman, Competitiveness: A Dangerous Obsession, **Foreign Affairs**, Vol. 73, No. 2, 1994, pp. 28-44

could be an indicator of national weakness and a trade deficit an indicator of strength.¹⁸⁹

3.1.2.2.3. The Double Diamond Model

Dunning argues that Michael Porter's diamond model underestimates the importance of globalizing production and markets for nations' competitive advantage. He stated that the reason for this is the increasing interaction between the cross-border and value-added activities of multinational companies, whose national competitive advantage directly or indirectly affects each of the components of the diamond. In this context, Dunning redeveloped the diamond model by adding multinational companies and governments into the model.¹⁹⁰

Krugman and D'Cruz (1993) stated that the country-based approach of Porter's diamond model was problematic. They cited Canada as an example of this issue. In their study, they aimed to adopt Porter's framework to explain Canada's multinational corporations, their foreign subsidiaries, and their access to the market of the United States through the Free Trade Agreement.¹⁹¹

As a result of the study, they stated that it is not possible to determine the true nature of Canada's international competitiveness by focusing only on the Canada-based diamond. In this direction, they developed the North American Diamond, which includes the United States of America. With the effect of the Free Trade Agreement, it has been revealed that America's production structure has directed Canada's production structure towards global thinking and planning accordingly.¹⁹²

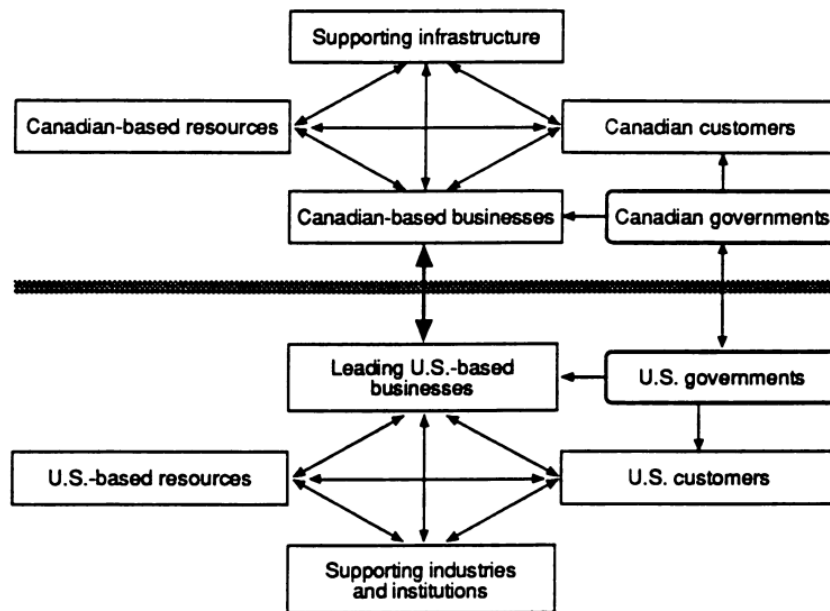
¹⁸⁹ P. Krugman, **op.cit.**, pp. 28-44

¹⁹⁰ J. H. Dunning, Internationalizing Porter's Diamond, **Management International Review** , 1993, Vol. 33, Extensions of the Porter Diamond Framework (1993), pp. 7-15

¹⁹¹ A. M. Rugman, J. R. D'Cruz, The "Double Diamond" Model of International Competitiveness: The Canadian Experience, **Management International Review** , 1993, Vol. 33, Extensions of the Porter Diamond Framework (1993), pp. 17-39

¹⁹² A. M. Rugman, J. R. D'Cruz, **op. cit.**, pp. 17-39

Figure 3.2: The Free Trade Agreement Links the Canadian and U.S. Diamonds into a North American Diamond



Source: Alan M. Rugman, Joseph R. D'Cruz, The "Double Diamond" Model of International Competitiveness: The Canadian Experience, *Management International Review*, 1993, Vol. 33, Extensions of the Porter Diamond Framework (1993), pp. 17-39

3.1.2.2.4. The Nine-Factor Model

The second addition to Porter's Diamond Model was conducted by Cho.¹⁹³ Cho argued that Porter's theory could only be applied to developed countries, while underdeveloped and developing countries do not even have the four factors in this model. In this context, Cho has introduced the Nine Factor Model, based on the need for a model that explains which factors countries should have in order to create and improve their competitiveness, and who will form these factors and how.¹⁹⁴ Cho divided these production factors into three groups:¹⁹⁵

¹⁹³ D. Cho, From National Competitiveness to Bloc and Global Competitiveness, *Competitiveness Review*, Volume 8 Issue 1, 1998, pp. 11-23

¹⁹⁴ N. Eruygur, *op. cit.*, pp. 15

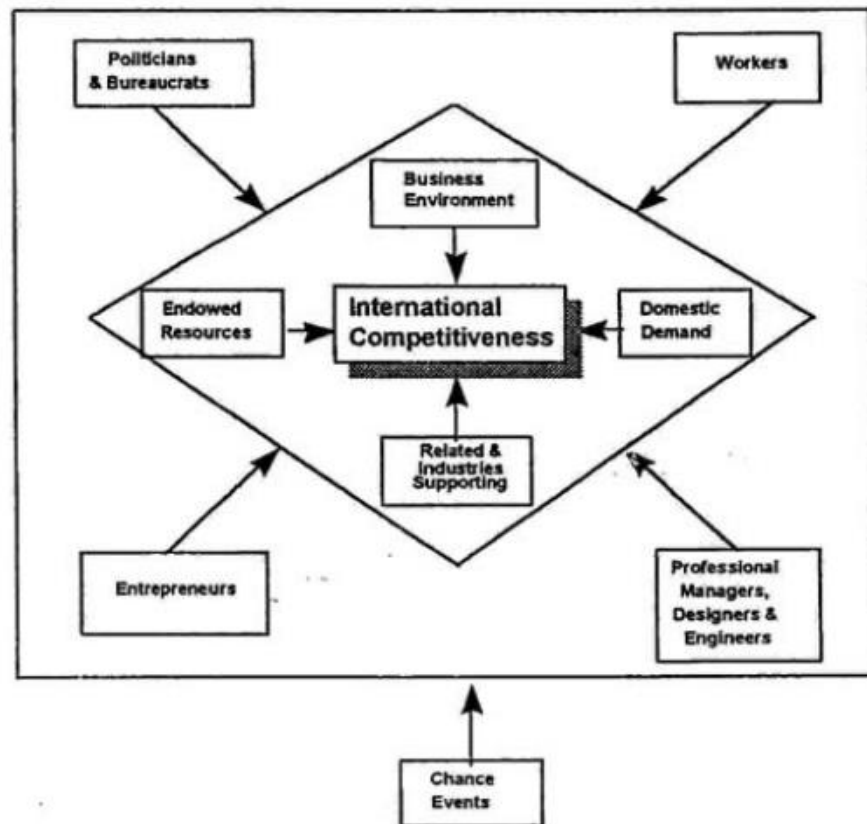
¹⁹⁵ D. Cho, *op.cit.*, pp. 11-23

- 1) Physical Factors
 - a) Endowed Resources
 - b) Business Environment
 - c) Related and Supporting Industries
 - d) Domestic Demand
- 2) Human Factor
 - a) Politicians and Bureaucrats
 - b) Entrepreneurs
 - c) Workers
 - d) Professional Managers, Designers, and Engineers
- 3) External Factors
 - a) Chance Events

In Cho's model, human factors and physical factors interact to promote the development of a nation. Moreover, according to the Nine Factor Model, productively arranging and combining physical factors is the primary driving force behind achieving national competitiveness.¹⁹⁶

¹⁹⁶ G. Staskevičiūt, R. Tamošiūnienė, The Evaluation of the National Competitiveness: Analysis of Existing Means, **6th International Scientific Conference May 13–14**, Vilnius Gediminas Technical University, 2010, pp. 495-503

Figure 3.3: The Nine-Factor Model of International Competitiveness



Source: Dong-Sung Cho, From National Competitiveness to Bloc and Global Competitiveness, Competitiveness Review, Volume 8 Issue 1, 1998, pp. 11-23

3.2. Measurement and Determinants of Competitiveness

The concept of competitiveness has occupied the minds of economists for more than two centuries. Similar to the complexities in its definition, there are different views on the measurement of competitiveness. In this context, some empirical research on the subject refers to the determinants of competitiveness at the enterprise level. The basis of this perspective is the belief that firms compete in international markets rather than nations. The measurement methods of competitiveness vary at the mega (global), macro (nations, regions), meso (economic sectors and industries), and micro (firm) levels. Indicators designed to measure competitiveness show past progress and can also be used for analyzing future potentials. In this context, the measurement of potential competitiveness is based on indicators such as technology, prices, and production cost. On the other hand, calculation methods based on historical information such as trade (market share) or

current account balance have limited power to assess potential competitiveness. In addition to all these, the real exchange rate, which can be calculated by using export prices, import prices, and unit labor costs, is one of the effective indicators that can be used to evaluate potential competitiveness. Besides, it is also substantial to determine whether the measurement of competitiveness represents the source or outcome of competitiveness when evaluating this term. For example, low price, low production cost, and high productivity are the reasons for a firm's strong competitiveness, while market share, RCA index, and trade balance represent the effects of international competitiveness.¹⁹⁷

3.3. Literature Review

AKGÜNGÖR et al. (2002) analyzed Turkey's Processed Fruit and Vegetable Sector's export competitiveness in the European Union market between 1994 and 1997 using Balassa's RCA index and CEP (Comparative Export Performance) index. In the study, Spain, Greece, and Portugal were determined as competitor countries according to the Export Similarity Index (ESI index) results. Results of the research indicated that Turkey's trade competitiveness is higher than Spain and Portugal in processed grape exports, and higher than Greece and Portugal in citrus exports. Turkey had a comparative disadvantage in processed tomato exports in this period.¹⁹⁸

ASTANEH et al. (2014) analyzed the export competitiveness of Iran's stone fruits between 1997-2010 in their study. They used RCA, RSCA, RXA indices in the analysis. Finally, they made trade mapping (TM) for cherry, plum, peach, and apricot products. Results of the research indicate that Iran had a comparative advantage only in 2007 and 2010. It has been concluded that there is a positive trend in the trade competitiveness of stone fruits in the examined period. Results of the trade mapping indicate that the shares of the agricultural products in world exports decreased between 1997-2010.¹⁹⁹

¹⁹⁷ T. Siudek, A. Zawojcka, **op.cit.**, pp. 98-102

¹⁹⁸ E. S. Akgüngör, **et. al.**, Competitiveness of the Turkish Fruit and Vegetable Processing Industry in the European Union Market, **Russian & East European Finance and Trade**, 38(3), 2002, pp. 34-53

¹⁹⁹ K. H. Astaneh, **et.al.**, Determining Revealed Comparative Advantage and Target Markets for Iran's Stone Fruits, **Journal of Agricultural Science and Technology**, 16(2), 2014, pp. 253-264

AYDIN and BASHIMOV (2018) analyzed the comparative advantage and specialization level of agricultural products of MINT countries (Mexico, Indonesia, Nigeria, and Turkey) using Balassa and Lafay indices in their study. The author used the data of the International Trade Center for the period 2002-2015 in the analysis phase. Results of the research indicate that Indonesia has a higher comparative advantage in animal and vegetable oils. In addition, it was concluded that Mexico and Nigeria had a higher comparative advantage in fresh vegetables and cocoa and cocoa preparations. Finally, according to the results, the products in which Turkey has a high comparative advantage were fresh fruits and milling products.²⁰⁰

BASHIMOV (2016a) analyzed Russia's comparative advantage in agricultural products between 2001-2013. He used Balassa's RCA index and HS (Harmonized Goods Definition and Code System) in his study. Results of the research indicate that Russia has a comparative advantage in HS 03, 10, 14, 15, 18, and 24 coded product groups.²⁰¹

BASHIMOV (2017b) analyzed the trade competitiveness of Turkey's agricultural and food products against Central Asian countries by using the RCA and RSCA indices in his study. The author obtained the foreign trade data used in the research from the database of the International Trade Center. Results of the research indicate that Turkey has a weak comparative advantage over the Central Asian countries in the trade of agricultural and food products.²⁰²

BASHIMOV (2017c) analyzed Turkey's comparative advantage for agricultural and food products. The author used The Revealed Comparative Advantage (RCA) index and the Trade Balance index (TBI) in his study. The data used in research is based on secondary sources and covers between 2002-2015. The author obtained the foreign trade data used in the study from the database of the International Trade Center. As a result of the study, it was concluded that Turkey has

²⁰⁰ A. Aydın, and G. Bashimov, Specialization and Foreign Trade in Agriculture Sector: A Study on the MINT Countries, Amasya University, **Journal of Social Sciences**, 2(4), 2018, pp. 261-282

²⁰¹ G. Bashimov, Russia's Comparative Advantage in Agricultural Products, **Journal of Economic Innovation**, 3(2), 2016, pp. 19-26

²⁰² G. Bashimov, Competitiveness of Turkey in Agricultural Products: Comparative Analysis with Central Asian Countries, **Turkish Journal of Agriculture and Natural Sciences**, 4(4), 2017(b), pp. 393-401

a comparative advantage in 11 product groups and a comparative disadvantage in 13 product groups according to the RCA index.²⁰³

ÇOBAN et al. (2010) analyzed the trade competitiveness of the Turkish agricultural sector against European Union countries by using Balassa's RCA index. Results of the research indicate that Turkey has a high trade competitiveness in the trade of fruit-vegetable, sugar-honey, and raw sugar product groups. On the contrary, it has very low trade competitiveness in the livestock product group.²⁰⁴

ERKAN (2012a) calculated the specialization and competitiveness indices for the exports of seven products (dried figs, raisins, dried apricots, hazelnuts, pistachios, walnuts, almonds) in his study. His study aims to determine the level of specialization in agricultural products in Turkey between 1993 and 2010. Erkan used the TBI, RXA, and RCA index in his analysis. Results of the research indicate that there is a specialization and comparative advantage in five of the agricultural products (figs, raisins, hazelnuts, pistachios, dried apricots). Furthermore, there is specialization and disadvantage in both almond and walnut.²⁰⁵

ERKAN et al. (2015b) calculated comparative advantage coefficients of vegetables for levels of SITC Rev. 3 and 4 in their study between 1993-2012 by using Balassa's RCA index. Results of the research indicate that Turkey has a significant comparative advantage in the export of vegetables and its sub-groups in the world markets. However, they have observed that although the vast majority of vegetable subgroups have a comparative advantage in their exports, the comparative advantages have declined in relative terms in recent years.²⁰⁶

MİRAL (2006) analyzed the trade competitiveness of Turkey's fruit and vegetable sector against the European Union between 1994-2005 in her study. She

²⁰³ G. Bashimov, Turkey's Comparative Advantage in Agricultural and Food Products, **Turkish Journal of Agricultural and Natural Sciences**, 4(3) , 2017(c), pp. 319-330

²⁰⁴ O. Çoban, A. E. Peker, and Y. Kubar, Sectoral Competitiveness of Turkish Agriculture Against European Union Countries, **Journal of Social Economic Research**, 10 (20), 2010, pp. 247-266

²⁰⁵ B. Erkan, Specialization Level of Turkey's Traditional Export Agricultural Products, **Journal of Social and Human Sciences**, Volume 4, No. 1, 2012(a), pp. 75-83

²⁰⁶ B. Erkan, et. al., Turkey's Comparative Advantages in Vegetable Exports, **KSU J. Nat. Sci.**, 18(4), 2015(b), pp. 70-76

used Balassa's RCA index to calculate competitiveness. Results of the research indicate that the Turkish fruit and vegetable sector has a comparative advantage against the European Union. The highest RCA values calculated between 1994-2005 belong to grapefruit, citrus fruits, and walnuts.²⁰⁷

ÖZDEMİR and KÖSEKAHYAOĞLU (2018a) analyzed Turkey's competitiveness in hazelnut, olive oil, and dried apricot products through Balassa's RCA and Vollrath's RXA indices. In the study, the index result of Turkey in each product was evaluated by comparing it with the top four exporting countries. According to the index results, the product in which Turkey had the highest competitiveness was dried apricot. The second strong product was hazelnut. Besides, according to the results, Turkey did not have a comparative advantage in olive oil exports.²⁰⁸

SUNTHARALINGAM et al. (2017) analyzed the competitiveness of selected products in Malaysia's tropical fruit industry by using the RCA index against the five major tropical-fruit exporters of Indonesia, Philippines, Thailand, China, and India. Results of the research indicate that Malaysia has a comparative advantage against the five countries it competes in watermelon exports. Malaysia has a comparative advantage over China and Indonesia in the global banana market. It has also been determined that Malaysia is the second most competitive country in papaya and pineapple exports after the Philippines. Furthermore, Malaysia has a comparative advantage over Indonesia and the Philippines in the global star fruit market. Finally, Malaysia only has a comparative advantage over China in the world mango market.

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ŞAHİNLİ (2014) analyzed the trade competitiveness of the agricultural products in Turkey between 2000-2011 in his study. In this analysis, he analyzed 601

²⁰⁷ Z. C. Miral, Revealed Comparative Advantages and Turkey's Competitiveness Against the European Union: An Application for Selected Agricultural Products, **Dokuz Eylül University**, Master Thesis, 2006

²⁰⁸ L. Kösekahyaoğlu, and M. B. Özdemir, Analysis of Turkey's Competitiveness in Hazelnut, Olive Oil and Dried Apricot Products by Revealed Comparative Advantages Method, **ASSAM International Refereed Journal**, 5(12), 2018, pp. 88-107

²⁰⁹ C. Suntharalingam, et.al., Competitiveness of Malaysia's Fruits in The Global Market: Revealed Comparative Advantage Analysis, **Malaysian Journal of Mathematical Sciences**, 11(S), 2017, pp. 143-157

agricultural products by using the food and agriculture trade data of the Food and Agriculture Organization (FAO) and the RCA index of Balassa. Results of the research indicate that there is a comparative advantage in 78 agricultural products.²¹⁰

TATAR (2020) conducted comparative advantage analyzes of the vegetable and fruit product group between Turkey and selected border neighbors by using the RCA and RSCA indices in his study. The analyzes are on a two-digit product group basis and cover the period of 2010-2019. The result of the study indicated that the product group in which Turkey is the most disadvantaged among country groups was the group with the SITC 54 coded (vegetables) in Turkey-Georgia foreign trade competitiveness. On the other hand, results indicated that the product group in which Turkey is the most advantageous among country groups, in terms of Turkey-Syria foreign trade competitiveness, is the SITC 57 coded (fresh/dried fruits and nuts, excluding oil nuts) group.²¹¹

TORAYEH (2013) analyzed the export competitiveness of Egypt's agricultural exports in the European Union between 1998 and 2010. He used RCA and CEP indices in the analysis. Results of the research indicate that Egypt lost its comparative advantages in the Saudi market in fruit and vegetable exports against its main competitors. In addition, according to the results obtained, it has been observed that the development in the Russian and Ukrainian markets is optimistic. Finally, the author states that Egypt has made progress over its main competitors in agricultural product exports.²¹²

TUNCA (2020) analyzed the comparative advantage of provinces in Turkey in agricultural product groups by using the RCA index of Balassa between the years 2015-2018. The author obtained the data to be used in his analysis from TURKSTAT. The result of the study indicates that any province did not stand out in

²¹⁰ A. M. Şahinli, Revealed Comparative Advantage and Competitiveness: Turkey Agriculture Sector, Yüzüncü Yıl University, **Journal of Agricultural Sciences**, 24(3), 2014, pp. 210- 217

²¹¹ H. E. Tatar, Measurement of Comparative Advantage in Vegetable and Fruit Product Group Between Turkey and Selected Border Neighbors, **International Review of Economics and Management**, 8(2), 2020, pp. 241- 255

²¹² N. M. Torayeh, The Competitiveness Of The Egyptian Agricultural Export In The Eu Market; Should Egypt Diversify Its Trade Pattern?, **Applied Econometrics and International Development**, Euro-American Association of Economic Development, 13(2), 2013, pp. 129-148

terms of agricultural performance and competitive structure. The number of provinces with comparative advantage in the product groups with codes 04 and 11 is the highest. 13 and 24 coded product groups are the product groups with the worst performance. Ankara, Adana, Burdur, Bursa, Denizli, Gaziantep, Mersin and Konya are the provinces with comparative advantage. It has been observed that provinces such as Ardahan, Bayburt, Karaman, Muş, Kütahya, Kars, Elazığ, Erzurum, Adıyaman and Bitlis do not have a comparative advantage in any product group.²¹³

3.4. Summary of Literature Review

Competitiveness at the macro level is generally measured using international-trade indices. In this context, there are various measurement methods based on trade intensity, net exports, and trade balance in the literature. When we examined the studies that calculate the trade competitiveness of the countries, we observed that the most widely used index is Balassa's RCA index. Besides, we can say that the other most commonly used indices are RSCA and RXA. In addition to all these, competitiveness comparisons may vary at the global, regional, or country level. In this context, some of the studies aim to analyze the trade competitiveness of countries on the basis of country or region comparisons, while others aim to examine the trade competitiveness of countries on a global basis. In particular, the Export Similarity index is generally used to identify competing countries in the analyzes conducted between countries. The foreign trade data used in the studies also vary as 2-digit or 4-digit. While the data used in the global analysis is generally 2-digit foreign trade data, it has been observed that 4-digit foreign trade data is used more frequently in regional or inter-country analyzes.

3.5. Methodology and Data

We used Harmonized Commodity Description and Coding System HS 2-digit export and import data in our study. Table 4.1 presents the titles of the selected product groups included in the HS classification used in the study. The data used in

²¹³ H. Tunca, Competitiveness of Agricultural Products: A Regional Analysis, **Pamukkale Journal of Eurasian Socioeconomic Studies**, 7(1), 2020, pp. 1-17

the study are in dollar terms and were obtained from the database of the International Trade Center. The study covers the period of 2009-2020.

In the analysis part of the study, we will calculate the competitiveness of Turkey's selected agricultural product groups against the world by using Balassa's (1965) RCA index (BI) and Vollrath's (1991) RTA (RCAV1), RC (RCAV2), and LNRXA (RCAV3) indices.

Table 3.2: The Product Codes and Names of Selected Agricultural Products in the HS Classification

Product code	Name of the product
01	Live animals
02	Meat and edible meat offal
03	Fish and crustaceans, molluscs and other aquatic invertebrates
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included
05	Products of animal origin, not elsewhere specified or included
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage
07	Edible vegetables and certain roots and tubers
08	Edible fruit and nuts; peel of citrus fruit or melons
09	Coffee, tea, maté and spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder

Source: ITC, (Online Access), <https://www.intracen.org/itc/market-info-tools/statistics-export-product-country/>, 12.12.2021

There are many indices related to the measurement of competitiveness in the literature. Balassa's RCA and Vollrath's LNRXA indices are widely used in these studies. Before the analysis part, we will first introduce Balassa's RCA, Vollrath's RTA, RC, LNRXA, and then RSCA and TBI indices used in our study.

The first studies on the measurement method of comparative advantages were brought to the literature by Liesner (1958). Liesner examined the UK's competitiveness for 60 products exported to Western Europe during the 1953-1956 period. Liesner aimed to identify the sectors in which the UK can compete against the European Common Market in his study. The formula developed by Liesner for this purpose is as follows: ²¹⁴

$$\text{Liesner's RCA Index} = X_{ij} / X_{nj}$$

²¹⁴ H. H. Liesner, The European Common Market and British Industry, *The Economic Journal*, Volume 68, Issue 270, 1 June 1958, pp. 302–316

In the formula, “X” refers to exports; “i” refers to the country subject to the analysis; “n” refers to the competing country and “j” refers to the product subject to the analysis.

After Liesner (1958), Bela Balassa (1965) derived an index that measures the revealed comparative advantage of a country in the trade of a particular product by calculating the share of that product in the country's total exports relative to the product's share in the total world exports.²¹⁵ The index can be presented as:

$$Balassa\ Index\ (RCA) = (X_{i,c,t} / \sum_i X_{i,c,t}) / (\sum_c X_{i,c,t} / \sum_i \sum_c X_{i,c,t})$$

where $X_{i,c,t}$ is export value for good “i”, country “c”, and year “t”.

If the Balassa index value is more than one, the country is said to have a revealed comparative advantage. In other words, the share of the product in the country's total exports is higher than its share in total world exports. Conversely, if the value is less than one, the country is said to have a comparative disadvantage in the product.²¹⁶

Jeroen Hinloopen and Charles V. Marrewijk (2001) interpreted the Balassa index from a different perspective. In other words, the interpretation of Balassa index values is based on the classification of RCA index values. These classifications are presented in Table 4.2.

Table 3.3: The Classification of RCA Index Values

Class A	$0 < \text{Balassa Index} \leq 1$	Revealed Comparative Disadvantage
Class B	$1 < \text{Balassa Index} \leq 2$	Weak Comparative Advantage
Class C	$2 < \text{Balassa Index} \leq 4$	Medium Comparative Advantage
Class D	$4 < \text{Balassa Index}$	Strong Comparative Advantage

Source: J. Hinloopen and C. V. Marrewijk, On the Empirical Distribution of the Balassa Index, Review of World Economics, Weltwirtschaftliches Archiv, 2001:8

²¹⁵ A. Gnidenchenko, and V. Salnikov, Net Comparative Advantage Index: Overcoming the Drawback of the Existing Indices, **SSRN Electronic Journal**, 2015, p. 5

²¹⁶ B. A. Topçu, and S. S. Sarigül, Comparative Advantage and the Product Mapping of Exporting Sectors in Turkey, **The Journal of Academic Social Science**, Year: 3, Issue: 18, 2015, p. 335

Vollrath (1991) derived two different ways to embody the demand dimension based on the difference between Revealed Export Advantage (RXA) and Revealed Import Advantage (RMA) in the competitiveness index.²¹⁷ These are:

$$RCA(V1)_{i,c,t} = RXA_{i,c,t} - RMA_{i,c,t}$$

$$RCA(V2)_{i,c,t} = \ln(RXA_{i,c,t}) - \ln(RMA_{i,c,t})$$

where $RXA_{i,c,t}$ and $RMA_{i,c,t}$ are Balassa-type trade intensity measures transformed in order to avoid double-counting:

$$RXA_{i,c,t} = \frac{X_{i,c,t}}{\sum_i X_{i,c,t} - X_{i,c,t}} / \frac{\sum_c X_{i,c,t} - X_{i,c,t}}{\sum_i \sum_c X_{i,c,t} - \sum_i X_{i,c,t} - \sum_c X_{i,c,t}}$$

$$RMA_{i,c,t} = \frac{M_{i,c,t}}{\sum_i M_{i,c,t} - M_{i,c,t}} / \frac{\sum_c M_{i,c,t} - M_{i,c,t}}{\sum_i \sum_c M_{i,c,t} - \sum_i M_{i,c,t} - \sum_c M_{i,c,t}}$$

Vollrath (1991) indicates that RCAV1 and RCAV2 have an important shortcoming: they are exposed to policy-induced distortions that arise from import protection, thus causing misrepresentation of underlying comparative advantage. Import restrictions, export subsidies, and other protectionist policies of governments can distort RCA indices. Therefore, he admits that in some cases a simple modification of the Balassa index would be preferable in calculations.²¹⁸

$$RCA(V3)_{i,c,t} = \ln(RXA_{i,c,t})$$

According to Vollrath (1991), positive index values revealed comparative advantage, whereas negative values revealed comparative disadvantage.

In addition, we will use the TBI index to examine Turkey's foreign trade balance in the analyzed product groups. The Trade Balance Index (TBI) (Lafay 1992) is derivated to analyze whether a country has specialization in export (as a net-exporter) or import (as a net-importer) for a specific group of products. The TBI index created by Lafay is formulated as follows:

²¹⁷ A. Gnidenko, and V. Salnikov, **op. cit.**, p. 11

²¹⁸ A. Gnidenko, and V. Salnikov, **op. cit.**, p. 12

$$TBI_{ij} = \frac{(X_{ij} - M_{ij})}{(X_{ij} + M_{ij})}$$

where TBI denotes the trade balance index of country “i” for the group of products “j”.

“Index values range from -1 to +1. In short, TBI equals -1 if a country is only importing; on the contrary, TBI is equal to +1 if a country is only exporting. The index is not defined when a country neither exports nor imports. In this case, we set zero as the product group shows the potential to either be exported or imported. Any value between -1 and +1 means that the country is exporting and importing at the same time. A country is called a "net importer" in a particular product group where the TBI value is negative, and a "net exporter" when the TBI value is positive”.²¹⁹

“The disadvantage of the relative net export index is its inability to identify the importance of export and import flows for the economy (in terms of volumes). For example, the index may take the value of 1 (very high specialization) even if the export is tiny, but the import is absent. Balassa index or Vollrath index (RCAV3) calculated from export data would correctly show very low specialization in this case.”.²²⁰

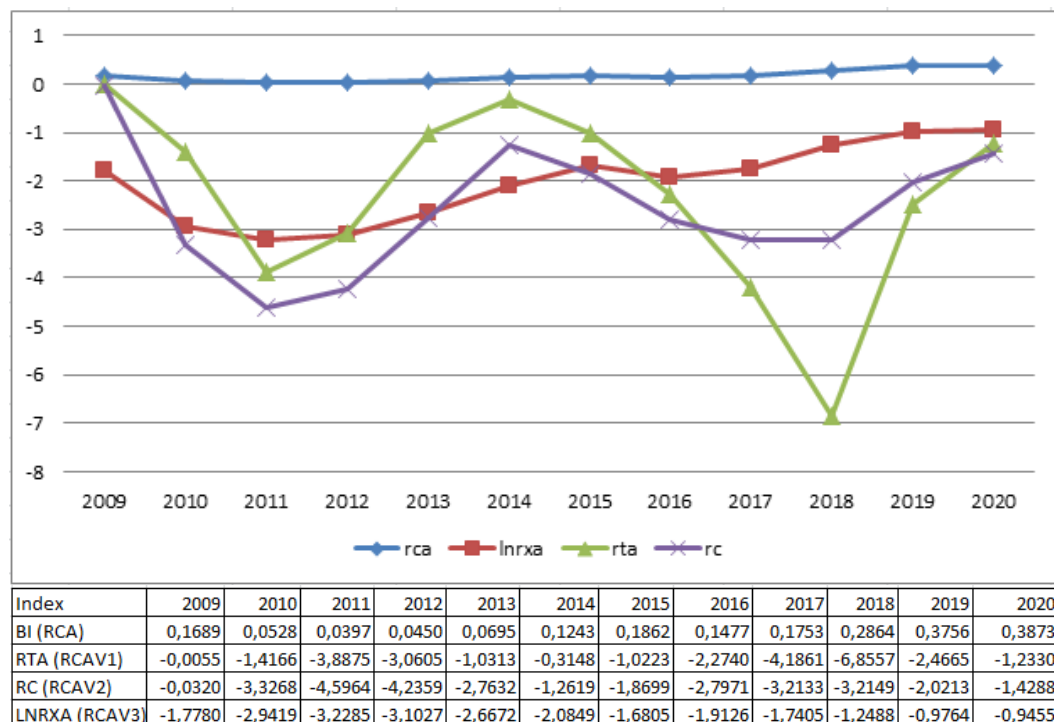
²¹⁹ B. A. Topçu, and S. S. Sarıgül, **op. cit.**, p. 336

²²⁰ A. Gnidenchenko, and V. Salnikov, **op. cit.**, p. 10

3.6. The Analysis of Revealed Comparative Advantages of Selected Agricultural Product Groups in Turkey by Balassa and Vollrath Methods

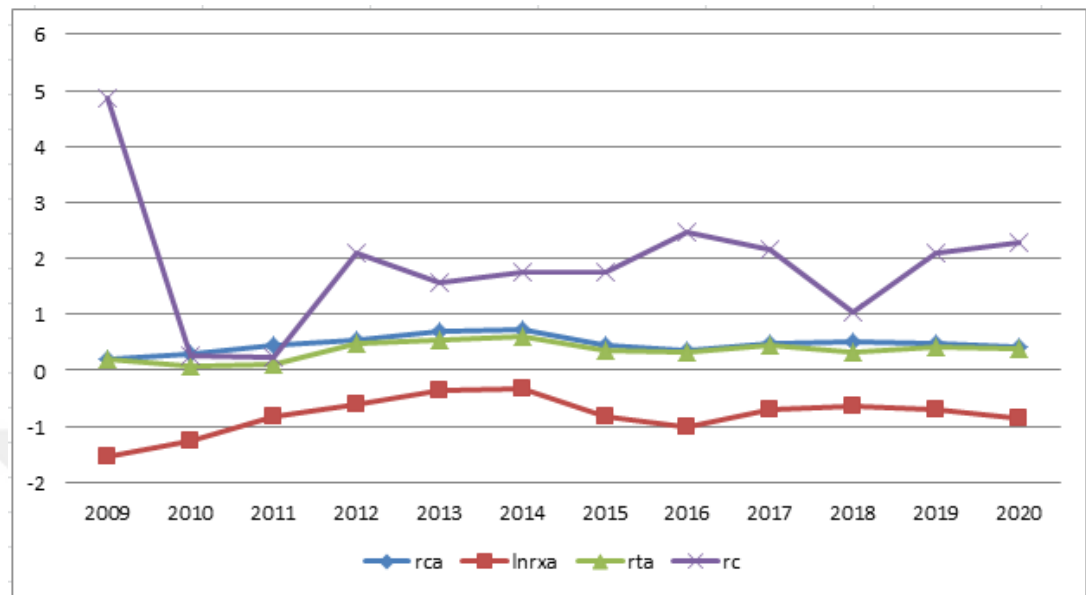
Lebanon, Georgia, the Syrian Arab Republic, Azerbaijan, Turkmenistan, Iraq, and Qatar were the countries that had the largest share in Turkey's live animal exports between 2009-2020. Live poultry had the largest share among the products subject to live animal exports. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009 and 2020 according to the RCA, RTA, RC, and LNRXA indices. When we examined the changes in the RCA and LNRXA index values, we observed that the trade competitiveness increased between 2009 and 2020. Also, we observed that in the years when the RTA and RC indices decreased rapidly, there was an increase in the import volume. The years with the highest comparative disadvantage were 2011 for the RCA, RC, and LNRXA indices and 2018 for the RTA index.

Graph 3.1: 01 Live Animals Index Trends and Values



Source: Authors' Calculations

Graph 3.2: 02 Meat and Edible Meat Offal Index Trends and Values

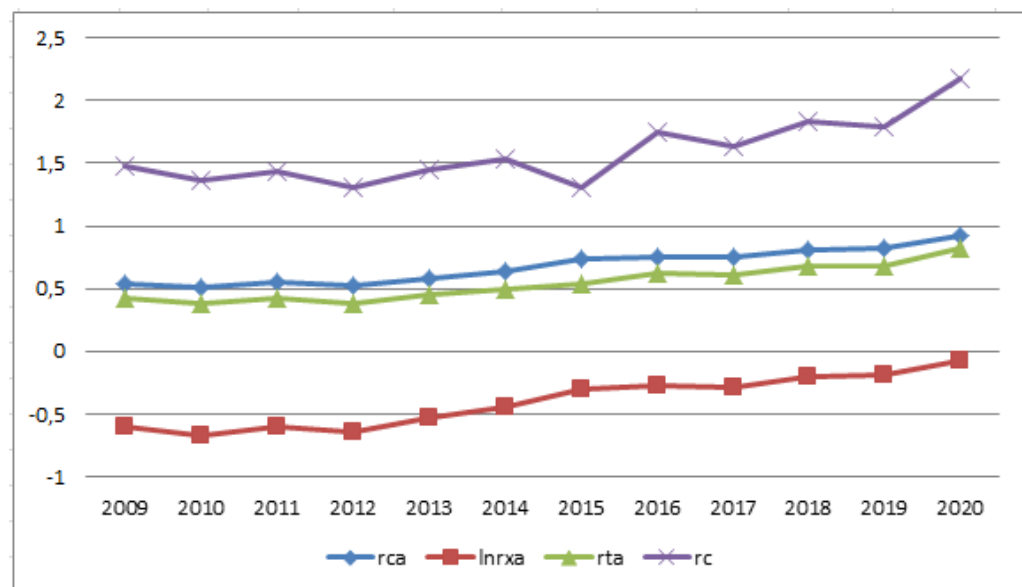


Source: Authors' Calculations

The countries with the largest share in Turkey's export of meat and edible meat offal between 2009-2020 were Iraq, Hong Kong (China), the Syrian Arab Republic, and Libya. In the meat and edible meat offal group, meat and edible offal of fowls such as duck, goose, turkey take the largest share among the products subject to export. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, we observed that Turkey had a comparative advantage between the years 2009-2020. In addition, we observed that the RC and RTA indices had the highest values in the years when imports decreased. Finally, when we analyzed the changes in the RCA and LNRXA index values, we observed an increase in trade competitiveness until 2014. The year in which the comparative disadvantage is highest was 2009 for the RCA and LNRXA indices.

The countries with the largest share in Turkey's export of fish and crustaceans, mollusks, and other aquatic invertebrates between 2009-2020 were Japan, Netherlands, Italy, Greece, Germany, Spain, England, Russian Federation. In this group, fish, fresh or chilled, and fish fillets have the largest share among the products subject to export. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009 and 2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, we observed that Turkey had a comparative advantage between the years 2009-2020. When we examined the changes in the RCA and LNRXA index values, we observed that trade competitiveness had increased over the years. Also, it is noteworthy that the RCA index almost approaches one, and the LNRXA index almost approaches 0, especially in 2020. The year in which the comparative disadvantage is highest was 2010 for the RCA and LNRXA indices.

Graph 3.3: 03 Fish and Crustaceans, Mollusks and Other Aquatic Invertebrates Index Trends and Values

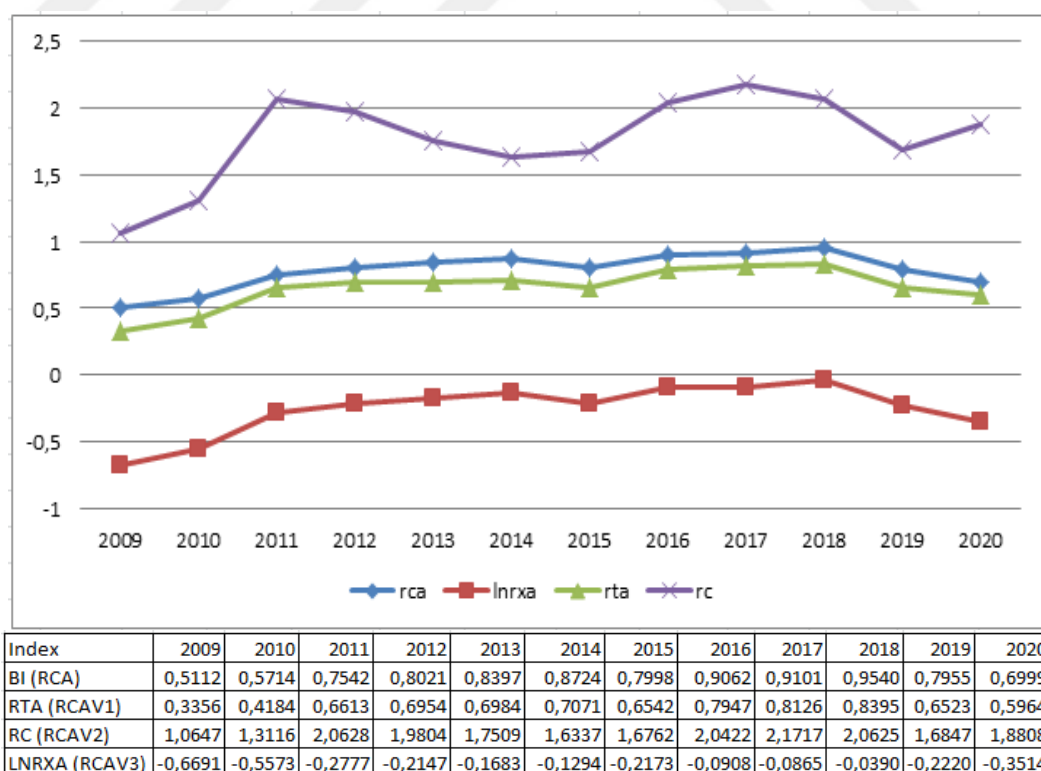


Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BI (RCA)	0,5447	0,5067	0,5494	0,5209	0,5851	0,6387	0,7341	0,7574	0,7505	0,8098	0,8192	0,9237
RTA (RCAV1)	0,4220	0,3785	0,4191	0,3812	0,4499	0,5026	0,5393	0,6285	0,6069	0,6840	0,6869	0,8267
RC (RCAV2)	1,4840	1,3707	1,4336	1,3113	1,4558	1,5330	1,3132	1,7462	1,6328	1,8310	1,7890	2,1831
LNRXA (RCAV3)	-0,6055	-0,6787	-0,5973	-0,6504	-0,5333	-0,4448	-0,3042	-0,2727	-0,2820	-0,2051	-0,1926	-0,0707

Source: Authors' Calculations

The countries with the largest share in Turkey's export of dairy products, bird's eggs, natural honey, edible products of animal origin (not elsewhere specified or included) between 2009-2020 were Iraq, Saudi Arabia, Qatar, United Arab Emirates, the Syrian Arab Republic, and Azerbaijan. In this group, bird's eggs (in shell, fresh, preserved, or cooked), cheese, and curd had the largest share among the products subject to exports. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, we observed that Turkey has a comparative advantage between the years 2009-2020. When we examined the changes in the RCA and LNRXA index values between 2009 and 2020, we observed that trade competitiveness decreased in 2015, 2019, and 2020. The year in which the comparative disadvantage is highest was 2009 for the RCA and LNRXA indices.

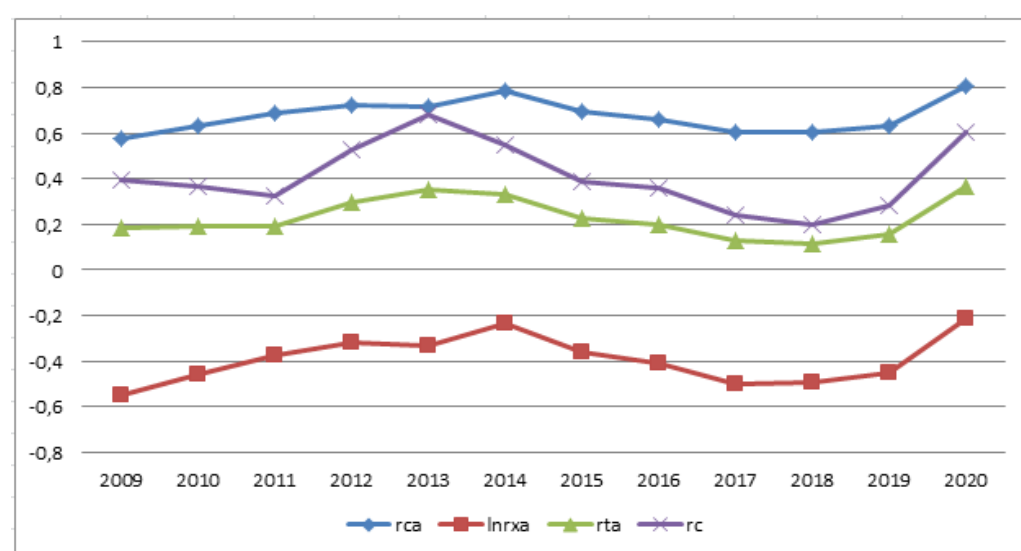
Graph 3.4: 04 Dairy Produce; Birds' Eggs; Natural Honey; Edible Products of Animal Origin, (not elsewhere specified or included) Index Trends and Values



Source: Authors' Calculations

Between 2009-2020, the countries with the largest share in Turkey's exports of animal origin products, which are not specified or included elsewhere in the tariff, were Germany, Austria, France, Denmark, and Vietnam. In this group, guts, bladders, and stomachs of animals (other than fish) had the largest share among the products subject to exports. All kinds of dead animals that are not edible for human consumption took the largest share in imports. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, it is observed that Turkey has a comparative advantage between the years 2009-2020. When we examined the changes in the RCA and LNRXA index values between 2009 and 2020, we observed that the trade competitiveness improved until 2014 and then returned to its former levels. After 2019, we observed that there was an improvement in trade competitiveness again. The year in which the comparative disadvantage is highest was 2009 for the RCA and LNRXA indices.

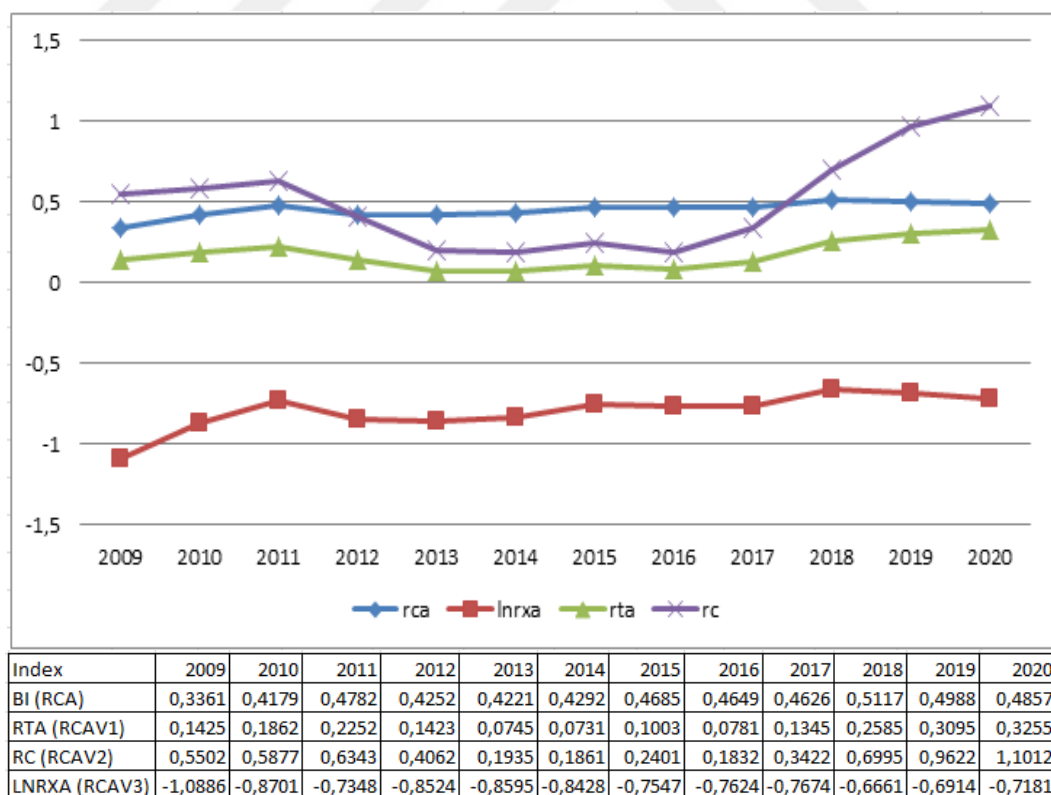
Graph 3.5: 05 Products of Animal Origin, (not elsewhere specified or included)
Index Trends and Values



Source: Authors' Calculations

Netherlands, England, Germany, Turkmenistan, Iraq, and Azerbaijan had the largest share in Turkey's exports of live trees and other plants, bulbs, roots, and the like, cut flowers and ornamental foliage between 2009-2020. In this group, live plants (including their roots, cuttings, and slips) and mushroom spawn took the largest share among the products subject to export. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, we observed that Turkey had a comparative advantage between the years 2009-2020. When we analyzed the changes in the RCA and LNRXA index values, we observed that trade competitiveness fluctuated at the same level after 2011. The year in which the comparative disadvantage is highest was 2009 for the RCA and LNRXA indices.

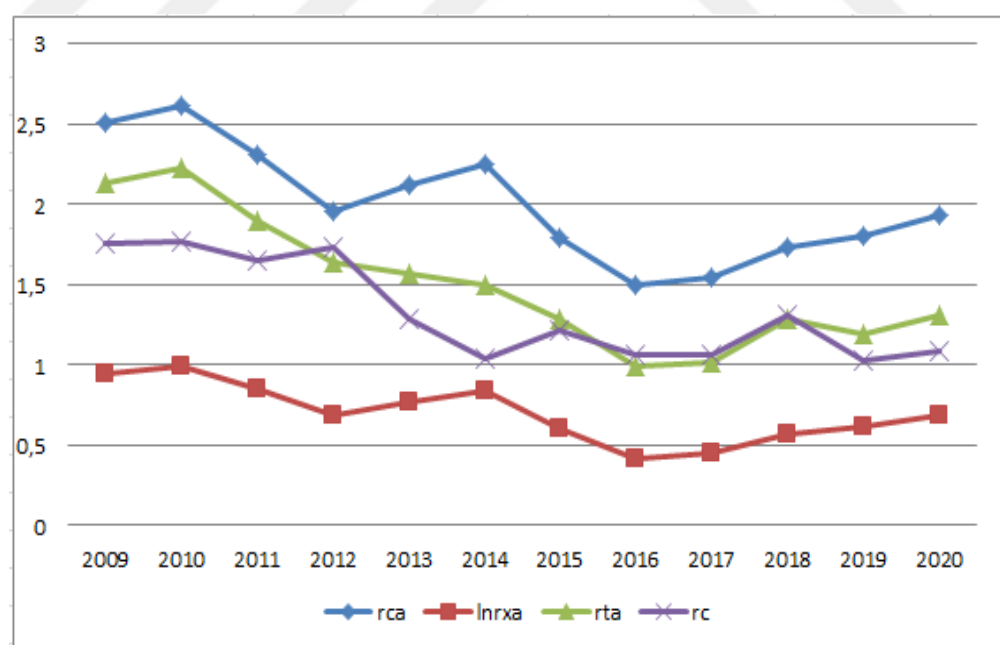
Graph 3.6: 06 Live Trees and Other Plants; Bulbs, Roots and the like; Cut Flowers and Ornamental Foliage Index Trends and Values



Source: Authors' Calculations

The countries with the largest share in Turkey's exports of Edible vegetables, certain roots, and tubers between 2009-2020 were Russia, Bulgaria, Iraq, Romania, Germany, and the Syrian Arab Republic. In this group, tomatoes had the largest share among the products subject to export. On the other hand, dry pulses had the largest share in imports. As a result of the calculations made for this product group, we found that Turkey had a comparative advantage between 2009-2020 according to the RCA, LNRXA, RTA, and RC indices. According to the classification of RCA index (Balassa Index) values presented by Hinloopen and Marrewijk, there is moderate comparative advantage in 2009, 2010, 2011, 2013, 2014, and weak comparative advantage in other years. The year in which the comparative advantage was highest was 2010 for all indices. Finally, we observed a decrease in the trade competitiveness of vegetables, certain roots, and tubers between 2010-2012 and 2014-2016.

Graph 3.7: 07 Edible Vegetables and Certain Roots and Tubers Index Trends and Values

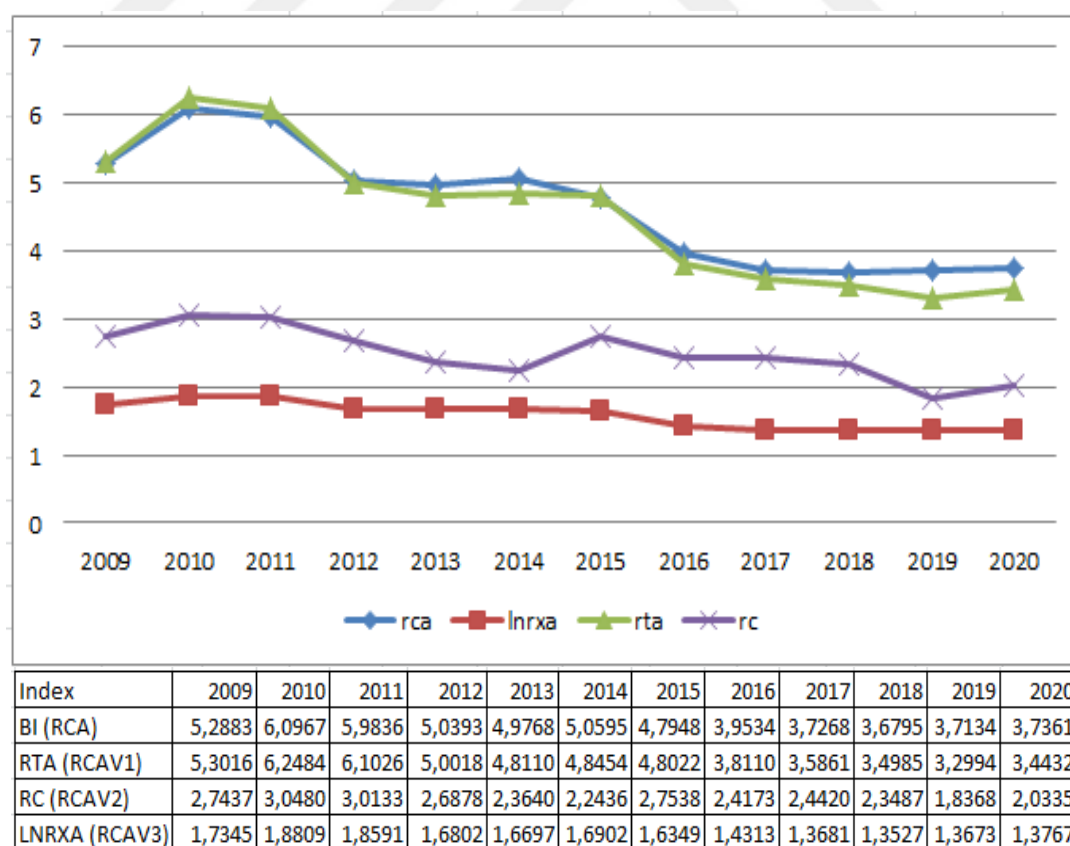


Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BI (RCA)	2,5041	2,6155	2,3055	1,9554	2,1194	2,2554	1,7971	1,4988	1,5402	1,7340	1,8081	1,9319
RTA (RCAV1)	2,1298	2,2259	1,9029	1,6397	1,5704	1,4939	1,2885	0,9985	1,0224	1,2912	1,1890	1,3091
RC (RCAV2)	1,7597	1,7673	1,6481	1,7283	1,2898	1,0392	1,2155	1,0665	1,0591	1,3146	1,0330	1,0848
LNRXA (RCAV3)	0,9449	0,9875	0,8571	0,6900	0,7734	0,8379	0,6053	0,4204	0,4480	0,5684	0,6130	0,6818

Source: Authors' Calculations

Russia, Italy, Germany, England, France, and Iraq had the largest share in Turkey's edible fruit and nuts, peel of citrus fruit, or melons exports between 2009-2020. In this group, other nuts (excluding coconuts, Brazil nuts, and cashew nuts), citrus fruits, and grapes had the largest share among the products subject to export. On the other hand, other nuts had the largest share in imports. As a result of the calculations made for this product group, we found that Turkey had a comparative advantage between 2009-2020 according to the RCA index and RTA, RC, and LNRXA indices. According to the classification of RCA index (Balassa Index) values presented by Hinloopen and Marrewijk, there was a strong comparative advantage between 2009-2015 and a medium comparative advantage between 2016-2020. The year in which the comparative advantage is highest was 2010 for all indices.

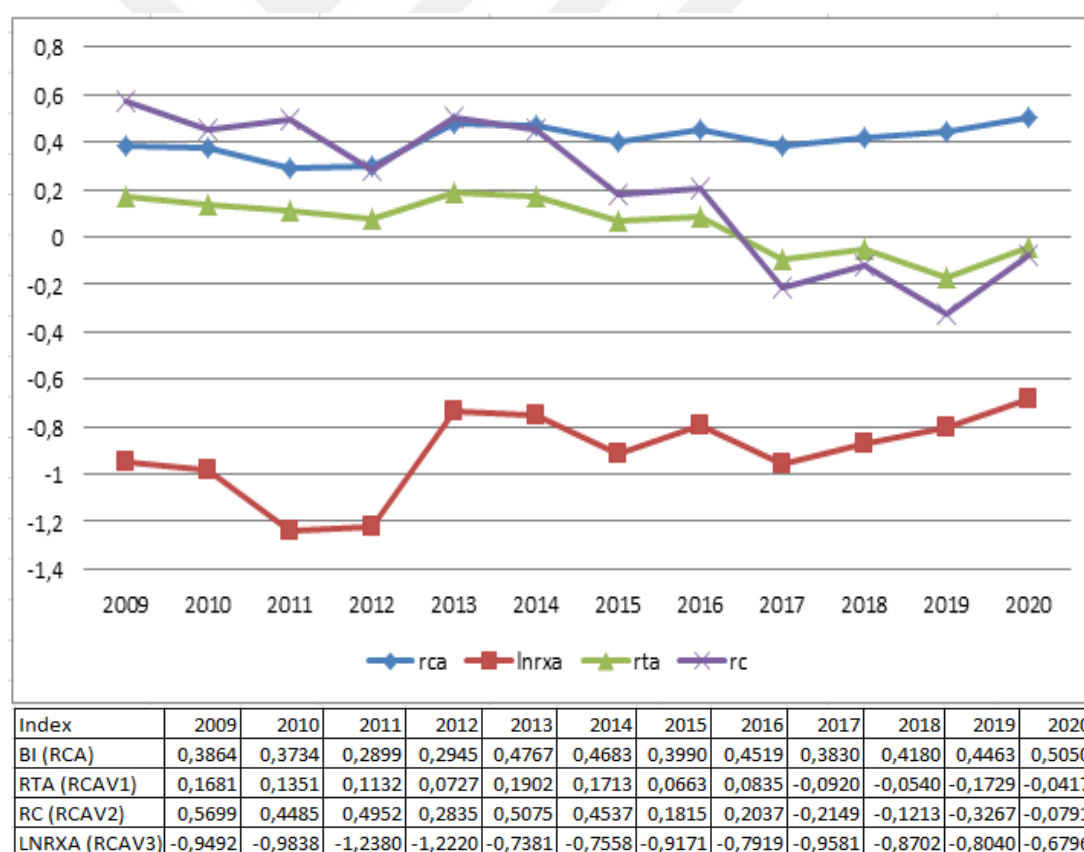
Graph 3.8: 08 Edible Fruit and Nuts, Peel of Citrus Fruit or Melons Index Trends and Values



Source: Authors' Calculations

Germany, Vietnam, Netherlands, the United States of America, and Belgium had the largest share in Turkey's coffee, tea, maté, and spices exports between 2009-2020. In this group, ginger, saffron, turmeric, thyme, bay leaves, curry, and other spices had the largest share among the products subject to export. On the other hand, coffee and tea had the largest share in imports. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's LNRXA index. However, according to Vollrath's RTA and RC indices, Turkey had a comparative advantage between the years 2009-2016. The year in which the comparative advantage is highest was 2011 for RCA and LNRXA indices.

Graph 3.9: 09 Coffee, Tea, Maté and Spices Index Trends and Values

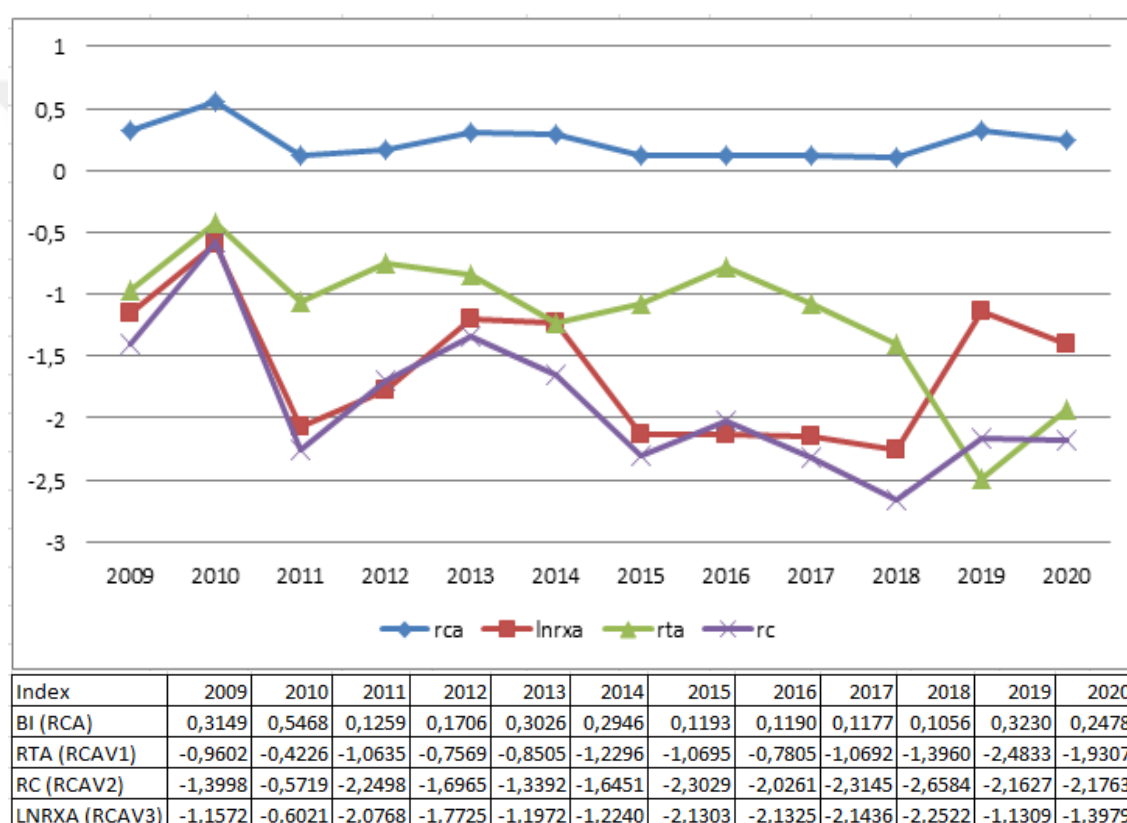


Source: Authors' Calculations

Iraq, Italy, the Syrian Arab Republic, and Libya were the countries that had the largest share in Turkey's cereals export between 2009-2020. In this group, corn, wheat, and rice had the largest share among the products subject to export. On the

other hand, wheat and barley had the largest share in imports. As a result of the calculations made for this product group, we found that Turkey did not have a comparative advantage between 2009-2020 according to the RCA, RTA, RC, and LNRXA indices. The year in which the comparative disadvantage was highest was 2015 for the RCA and LNRXA indices. In 2019, when the RTA index had the lowest value, grain import reached its highest level in the last 12 years.

Graph 3.10: 10 Cereals Index Trends and Values

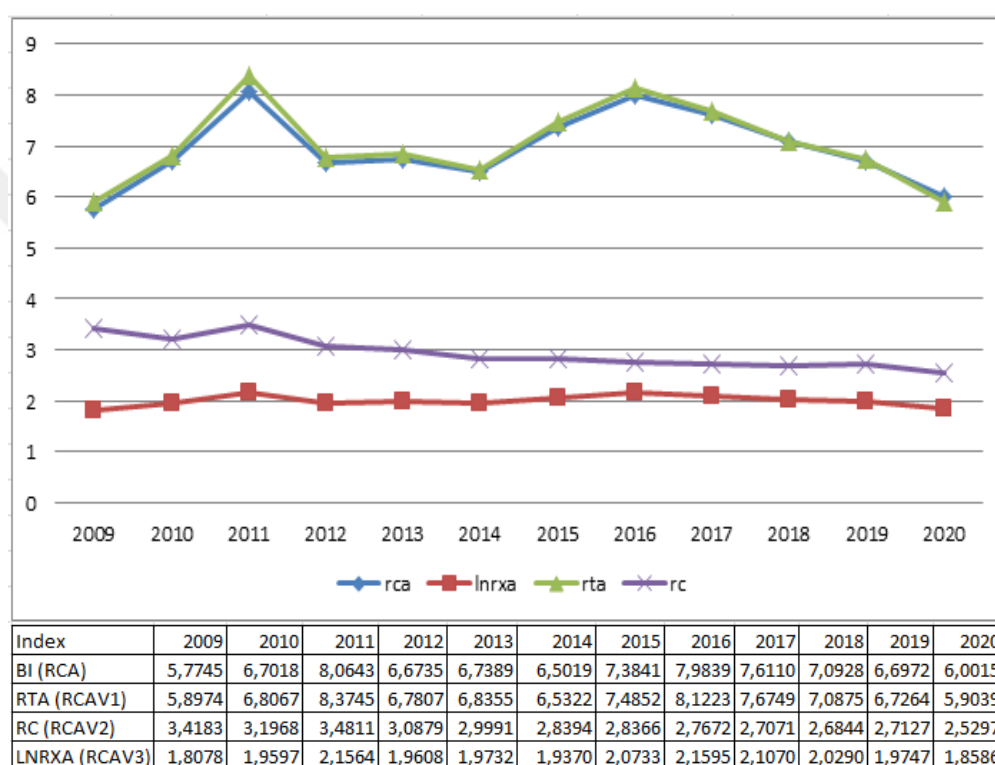


Source: Authors' Calculations

Iraq, Indonesia, the Philippines, Libya, and Angola had the largest share in Turkey's milling industry exports between 2009-2020. In this product group, wheat flour took the largest share among the products subject to export. As a result of the calculations for milling products, we found that Turkey had a comparative advantage between 2009-2020 according to Balassa's RCA index and Vollrath's RTA, RC and LNRXA indices. On the other hand, according to the classification of RCA index (Balassa Index) values produced by Hinloopen and Marrewijk, there was a strong

comparative advantage between 2009 and 2020. The year in which the comparative advantage is highest was 2011 for the RCA, RTA, and RC indices and 2016 for the LNRXA index. Finally, according to the RCA and LNRXA indices, a decrease in trade competitiveness was observed after 2017.

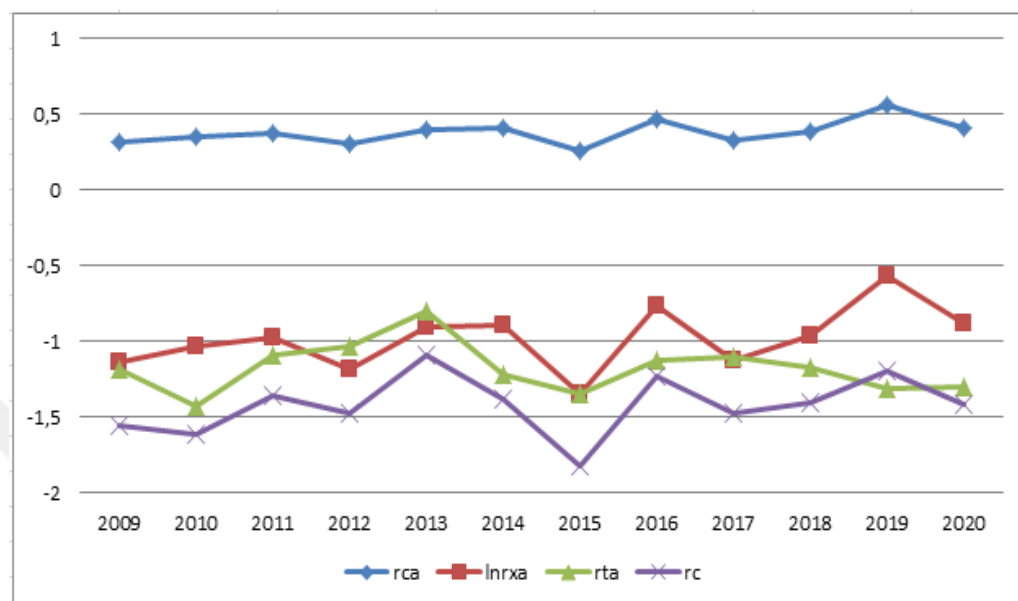
Graph 3.11: 11 Products of The Milling Industry; Malt, Starches, Inulin, Wheat Gluten Index Trends and Values



Source: Authors' Calculations

India, Germany, Russia, Netherlands, Ukraine, USA, and Italy had the largest share in Turkey's export of oilseeds and other products between 2009-2020. In this product group, sunflower seeds, other oilseeds, and oily fruits (excluding edible nuts, olives, soybeans, peanuts, copra, linseed, rapeseed, or rapeseed seeds, and sunflower seeds) took the largest share among the products subject to export. According to Balassa's RCA index and Vollrath's RTA, RC, and LNRXA indices, Turkey did not have a comparative advantage in this product group between 2009-2020. The year in which the comparative disadvantage was highest was 2015 for the RCA, RC, and LNRXA indices. For the RTA index, the year in which the comparative disadvantage was highest was 2010.

Graph 3.12: 12 Oil Seeds and Oleaginous Fruits; Miscellaneous Grains, Seeds and Fruit; Industrial or Medicinal Plants; Straw and Fodder Index Trends and Values



Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
BI (RCA)	0,3188	0,3562	0,3760	0,3075	0,4023	0,4097	0,2601	0,4655	0,3246	0,3807	0,5660	0,4142
RTA (RCAV1)	-1,1898	-1,4359	-1,0979	-1,0392	-0,8037	-1,2201	-1,3483	-1,1263	-1,1002	-1,1779	-1,3114	-1,2986
RC (RCAV2)	-1,5548	-1,6158	-1,3661	-1,4778	-1,0977	-1,3804	-1,8233	-1,2286	-1,4798	-1,4095	-1,1968	-1,4193
LNRXA (RCAV3)	-1,1437	-1,0325	-0,9782	-1,1804	-0,9104	-0,8918	-1,3483	-0,7634	-1,1260	-0,9657	-0,5660	-0,8811

Source: Authors' Calculations

3.7. The Results of the Trade Balance Index

Graph 3.13: The Results of the Trade Balance Index of Twelve Product Groups

Years/Groups	1	2	3	4	5	6	7	8	9	10	11	12
2009	-0,16	0,98	0,50	0,36	0,04	0,14	0,61	0,81	0,14	-0,71	0,90	-0,74
2010	-0,96	-0,09	0,40	0,41	-0,06	0,06	0,56	0,83	0,0003	-0,50	0,86	-0,79
2011	-0,99	-0,14	0,39	0,64	-0,10	0,06	0,49	0,82	-0,03	-0,89	0,88	-0,76
2012	-0,98	0,69	0,40	0,65	0,06	0,04	0,55	0,79	-0,07	-0,80	0,86	-0,75
2013	-0,93	0,51	0,46	0,56	0,13	-0,09	0,36	0,70	0,03	-0,73	0,84	-0,67
2014	-0,68	0,60	0,52	0,54	0,10	-0,06	0,29	0,69	0,04	-0,78	0,83	-0,73
2015	-0,81	0,61	0,45	0,57	0,03	-0,02	0,39	0,81	-0,08	-0,88	0,83	-0,81
2016	-0,91	0,80	0,62	0,69	0,04	-0,03	0,35	0,76	-0,05	-0,84	0,82	-0,66
2017	-0,94	0,72	0,56	0,71	-0,03	0,01	0,31	0,75	-0,28	-0,88	0,80	-0,74
2018	-0,94	0,37	0,65	0,71	-0,004	0,24	0,48	0,75	-0,19	-0,90	0,82	-0,70
2019	-0,78	0,76	0,67	0,64	-0,10	0,43	0,42	0,66	-0,22	-0,82	0,84	-0,60
2020	-0,69	0,77	0,74	0,67	0,20	0,44	0,39	0,68	-0,14	-0,84	0,80	-0,68
Average	-0,81	0,55	0,53	0,60	0,03	0,10	0,43	0,75	-0,07	-0,80	0,84	-0,72

Source: Authors' Calculations

CONCLUSION

In this study, we analyzed the trade competitiveness of selected agricultural product groups in the world market and the change in competitiveness between the years 2009-2020 in Turkey. In this context, before discussing the trade competitiveness of Turkey's agricultural products in our study, we examined the structure of the Turkish agricultural sector, the contribution of the agricultural sector to the Turkish economy, and Turkey's agricultural policies.

Turkey started to increase its agricultural gross domestic product rapidly after 2001. This increase continued until 2010, and the agricultural gross domestic product reached 69.6 billion dollars in 2010, the highest value in the last 20 years. After 2010, Turkey's agricultural gross domestic product entered a decreasing trend. In this direction, we can say that Turkey started to lose the momentum it gained in the early 2000s after 2010. The main reason for the loss of this momentum is the inefficient use of resources in agricultural production in Turkey. In Turkey, which started to abandon the labor-intensive production structure in agriculture after 2000, producers engaged in agriculture activities began to follow the developments in the sector with the positive effect of the increase in the use of technology in the last ten years. However, the desired success cannot be achieved in the change of traditional behaviors and habits of the producers in our country. In this direction, the government must pay more attention to developing training strategies and consultancy systems for producers to improve their awareness level. In the 2019-2023 Strategic Plan of the Ministry of Agriculture and Forestry, fundamental targets have been set for the development of education strategies and consultancy systems. However, due to the Covid-19 pandemic that started at the end of 2019, it is apparent that there will be problems in reaching the goals related to education.

As a result of our study, the utmost risks Turkey has faced in ensuring the continuity of sustainable production in agriculture in recent years were: (1) loss of productivity and quality in agricultural production due to climate and environmental factors, (2) failure to ensure the sustainability of soil and water resources as a result of climate change and improper agricultural practices, (3) financing and productivity

problems arising from the small enterprises structure in the agricultural sector, (4) foreign dependency and high costs in agricultural inputs and technologies, (5) the problem of lands remaining idle due to ownership and transfer problems of agricultural lands, (6) failure to increase the insurance rate in agricultural production at the desired level, (7) a decrease in the qualified workforce and the young population in rural areas, (8) shortage of roughage due to the misuse of pasture lands, (9) low yield in milk and meat production due to animal diseases, (10) infertility problem of dairy cows occurring due to wrong feeding programs based on milk yield, and (11) decreased stocks of fishery products due to pollution in the seas.

As a result of our calculations, we concluded that three of the analyzed product groups had a comparative advantage, while nine of them had a comparative disadvantage. Turkey had a comparative advantage in product groups coded 07, 08, and 11 between 2009-2020. On the other hand, Turkey had a comparative disadvantage in product groups coded 01, 02, 03, 04, 05, 06, 09, 10, and 12 between 2009-2020. While Turkey was a net exporter in the product groups coded 02, 03, 04, 05, 06, 07, 08, and 11, it was a net importer in the product groups coded 01, 09, 10, and 12 according to an average of trade balance index results between 2009 and 2020. In addition, when we analyzed the index trends, we observed that Turkey's share in the global market increased between 2009 and 2020 in the product groups coded with 01, 02, 03, 04, 05, 06, 09, 11, and 12. On the other hand, Turkey's share in the global market decreased between 2009 and 2020 in the product groups with codes 07, 08, and 10.

According to our calculations, the product group coded 09 between 2009-2016, and product groups with codes 02, 03, 04, 05, and 06 between 2009-2020 had a comparative disadvantage according to RCA and LNRXA indices. However, these product groups had a comparative advantage over RTA and RC index calculations. We think that this difference between index results is caused by the country's import and export structure or the state's intense interventions in product groups. Interventions such as import restrictions (RMA ↓) and export subsidies (RXA ↑) applied to these product groups cause the RTA and RC indices to take positive values. Accordingly, we conclude that there is not always a positive relationship

exists between comparative advantage and balance of trade for the RCA, RTA, RC, and LNRXA indices.

The first part of the study, in which we examined the agricultural structure of Turkey, is limited to the data we obtained from TURKSTAT and the Ministry of Agriculture and Forestry of the Republic of Turkey. In this context, we preferred not to conduct yield analysis in crop products due to insufficient data on sown area and the number of trees for many crops. In the last part, where the trade competitiveness of selected agricultural product groups in Turkey is calculated, we preferred to use two-digit foreign trade data since we made a world market analysis. Since we did not provide information about processed agricultural products in the first part of the study, we preferred to examine only the first 12 product codes. In future studies on the subject, we can consider conducting trade competitiveness analysis in smaller markets and using four-digit trade data instead of two-digit.

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