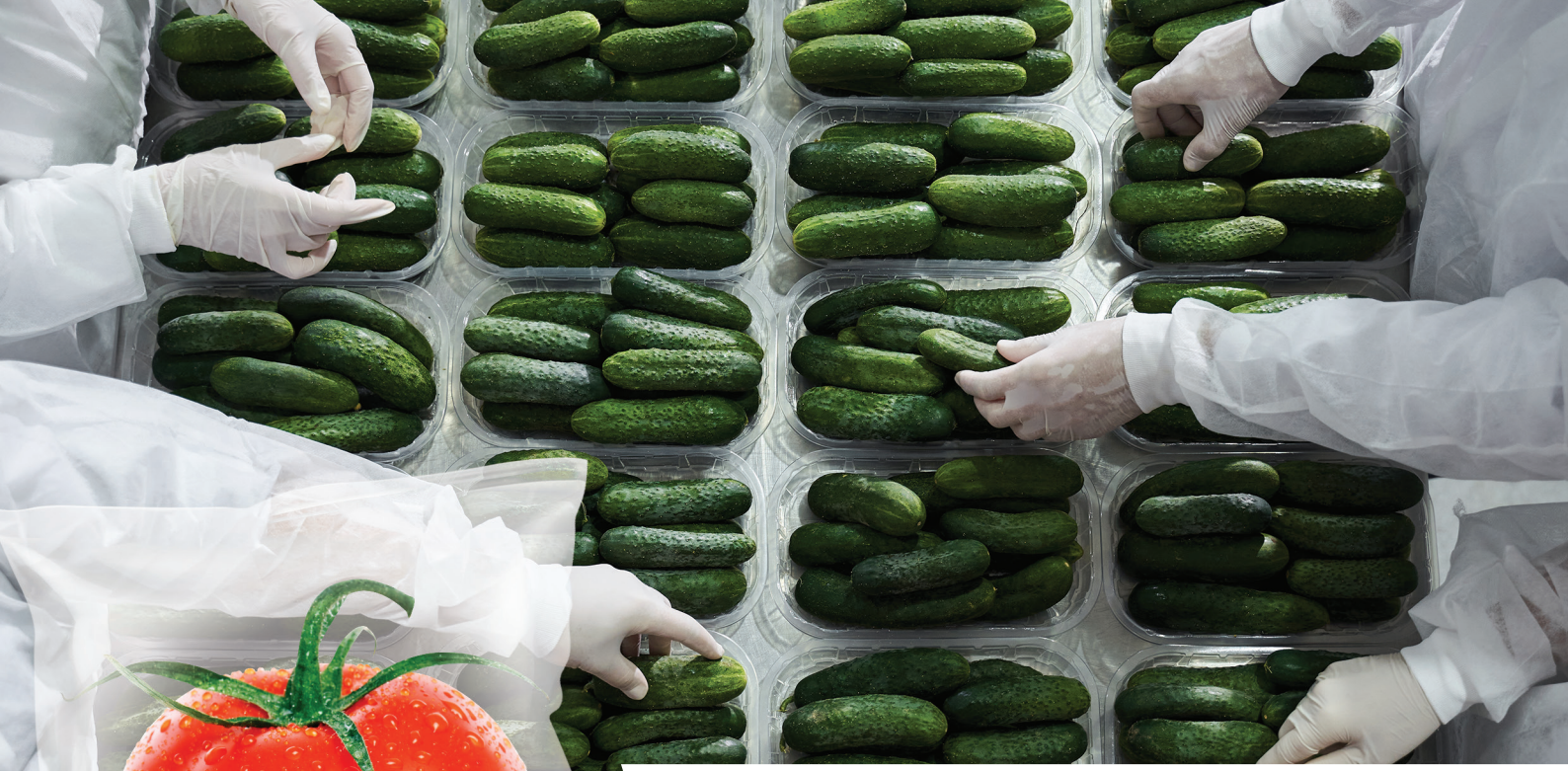

From the People of Japan

REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY AND TECHNOLOGY

UNDP

COVID-19 Crisis Response and Resilience Project

FOOD INDUSTRY ANALYSIS REPORT AND GUIDE

TR21 REGION

(Tekirdağ, Edirne, Kırklareli)

FOOD SECTOR ANALYSIS REPORT AND GUIDE

TR21 Region (Tekirdağ, Edirne, Kırklareli)

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COVID-19 Crisis Response and Resilience Project

FOOD INDUSTRY ANALYSIS REPORT AND GUIDE

TR21 REGION

(Tekirdağ, Edirne, Kırklareli)

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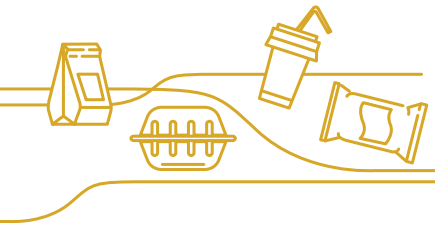

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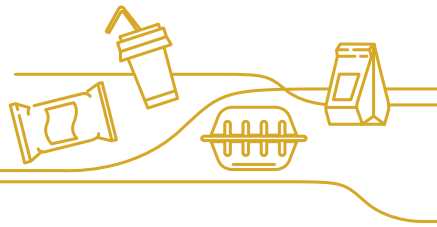

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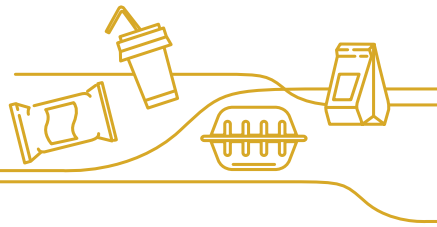


BAKA	West Mediterranean Development Agency
CEC	Continuing Education Center
CCO	Chamber of Commerce and Industry
COVID-19	Coronavirus Disease
CRA	Credit Reference Agency
DA	Development Agencies
DİKA	Dicle Development Agency
DSİ	State Hydraulic Works
ERP	Enterprise Resource Planning
EU	European Union
FAO	United Nations Food and Agriculture Organization
FCC	FAO Food Chain Crisis Management Framework
GMKA	Southern Marmara Development Agency
GMO	Genetically Modified Organism
GPS	Global Positioning System
Ha	Hectare
HACCP	Hazard Analyses and Critical Control Points (Product reliability system for healthy food production in food premises)
HS	Harmonized System (World Customs Organization Coding System)
INTRACEN	International Trade Center
IPCC	Intergovernmental Panel on Climate Change
IPR	Intellectual Property Rights
Kg	Kilogram
KOP	Konya Plain Project
KUDAKA	North East Anatolia Development Agency
MEVKA	Mevlana Development Agency
MoNE	Republic of Turkey Ministry of National Education
NACE	Statistical Classification of Economic Activities in the European Community
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development
OIZ:	Organized Industrial Zone (Special Economic Zone)
P&D	Product Development
PESTLE	Political, Economic, Social, Technological, Legal and Environmental
R&D	Research and Development
RFID	Radio Frequency Identification
SME	Small and Medium Sized Enterprise
SSI	TR Social Security Institution
STB	TR Ministry of Industry and Technology
STIC	Standard International Trade Classification
SWOT	Strengths, Weaknesses, Opportunities and Threats
TARMAKBİR	The Turkish Association of Agricultural Machinery & Equipment Manufacturers
TGDF	Federation of Food and Drink Industry Associations of Turkey
TKDK	Agriculture and Rural Development Support Institution
TL	Turkish Lira
TRAKYAKA	Trakya Development Agency
TÜBİTAK	The Scientific and Technological Research Council of Turkey
TÜBİTAK-MAM	Scientific and Technological Research Council of Turkey - Marmara Research Center
TURKSTAT	Turkish Statistical Institute
TÜSİAD	Turkish Industry and Business Association
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
USA	United States of America
ZAFER	Zafer Development Agency
WTO	World Trade Organization

FOREWORD

The COVID-19 pandemic has gone beyond a health crisis and turned into a global problem, due to its impacts felt in all areas of life and all over the world. It is obvious that the problems caused by the pandemic, which has turned into a serious threat to all humanity, can be solved with a sustainable and fair understanding that requires international solidarity, cooperation, and common solution ideas.

The restrictions applied as a necessity of the pandemic led to slowdown in production, decrease in labor supply, delay in the supply of intermediate goods and raw materials, and increased logistics costs in our country as well as all over the world. Therefore, it is essential for sustainable development that policies should focus on the fragile sectors most affected by the pandemic in order to ensure the continuity of economic activities and accelerate the recovery.

By closely following the changes observed in the global system, Turkey carries out a comprehensive transformation in every field from education to health, from manufacturing industry to tourism, from industrial zones to research infrastructures.

Our development agencies, which perform their activities under the coordination of the Ministry of Industry and Technology, carry out studies at the regional level in order to reduce the negative impacts of COVID-19 on the national and regional economies and to identify the sectors most affected by the pandemic. One of our works in this field is the Government of Japan funded COVID-19 Resilience and Response Project, which we have implemented together with the United Nations Development Program (UNDP), the General Directorate of Development Agencies, and our development agencies.

Within the scope of the project, 25 region-based “fragile sector analysis reports” were prepared in the textile, logistics, food, machinery, and automotive sectors, which are of key importance for the Turkish economy. These reports, taking into account global developments and trends, offer new policy recommendations that will increase the resilience of the relevant sectors against crises. In addition, the “New Market Analysis” and “Product Space Analysis” reports, which cover studies to increase the export potential of enterprises operating in fragile sectors, were also completed within the project. These reports aimed to create road maps to support the business continuity of fragile sectors and to prevent supply chain disruptions.

We believe that the policy recommendations in these reports, which are in line with the targets within the framework of our national technology move, will support inclusive and sustainable development; it will carry Turkey to a more strategic point in the international trade and investment decisions that will be reshaped in the post-COVID-19 period and will contribute to our country's 2023 goals.

I would like to thank the Government of Japan for their generous contribution to mitigating the economic impact of the COVID-19 crisis, ensuring economic recovery, strengthening sectors, and transforming SMEs in this process.

I congratulate all our stakeholders, particularly UNDP Turkey management and project team, and the employees of the Development Agencies General Directorate and development agencies, who have made these studies realised and turn them into concrete outputs, and I hope that the reports will contribute to the future of our country.

Mustafa Varank

Republic of Turkey Minister of Industry and Technology

FOREWORD

The global context for development has fundamentally changed with the COVID-19 pandemic. The pandemic created many new obstacles to overcome as well as new problems to be solved. Although COVID-19 started as a health crisis, it has turned into both a humanitarian crisis and a development crisis.

This unprecedented crisis is pushing millions of people into extreme poverty, changing and widening existing inequalities, and disrupting progress towards the Sustainable Development Goals (SDGs). Therefore, the SDGs are now more important than ever. The 2030 Agenda remains the only option for a more prosperous future for people and planet.

The COVID-19 pandemic has also shaken the global trade and development landscape. The global health emergency turned into a global economic shock with its impacts on growth, international trade, investments, global production, value chains, employment and eventually livelihoods of people.

UNDP is responding to a growing volume of requests from countries to help them prepare for, respond to, and recover from the COVID-19 pandemic with a particular focus on the most vulnerable. As of now our focus is to help decision-makers look beyond COVID-19 recovery, towards 2030, making choices and managing complexity and uncertainty in four key areas: governance, social protection, green economy, and digital disruption.

UNDP's COVID-19 Resilience and Response Project, which is funded by the Government of Japan is a part of our rapidly developed integrated response to the COVID-19 health, humanitarian, and development crisis. Being complementary with the efforts of the Government of Turkey and other development partners and fully aligned with the country-specific needs, UNDP aims to tackle the impacts of the pandemic under three priority areas: Health system support; Inclusive and integrated crisis management and response; Social and economic impact needs assessment and response.

I am pleased to present these 25 region-based sectoral analysis reports that provide policy recommendations and action plans for key economic sectors in Turkey that are most impacted by COVID-19 pandemic. These reports, which were developed within the COVID-19 Resilience and Response Project in cooperation with Ministry of Industry and Technology and Development Agencies, formulated in the light of recent global context and trends as well as UNDP's response to COVID-19 crisis. Through this work, our aim is to support national capacities for an integrated and inclusive crisis management, ensure business continuity and prevent supply chain disruptions and speed up the development of the key economic sectors -automotive, textile, food, machinery, and logistics in different regions of Turkey and to increase competitiveness on a regional basis.

Our recovery efforts focus on rebuilding more inclusive economies and societies, moving towards a low-carbon and climate-resilient world where no one is left behind.

We believe that these reports will provide a pathway for economic recovery of sectors and development of regional competitiveness. In the reports the review of the pandemic crisis impact is accompanied by a set of policy recommendations targeting both the interventions in response to the negative effects of the pandemic and the post-COVID-19 social and economic recovery support measures. Overcoming the challenges faced by the sectors and society and ensuring better recovery can only be possible with joint efforts of the entire private sector, authorities, and the society as a whole.

In this regard, we appreciate the cooperation of Ministry of Industry and Technology, Development Agencies, and all experts for the preparation of these reports. We believe that these reports will also enable better cooperation in key economic sectors and help to accelerate the implementation of the Sustainable Development Goals in Turkey.

Louisa Vinton

UNDP Turkey Resident Representative

EXECUTIVE SUMMARY

Following the COVID-19 pandemic, a study was conducted where current situation analyses, short, medium, and long-term strategies, and policy recommendations in sectoral, national, and regional terms were defined in order to contribute to SME's development of more inclusive and sustainable business models aimed at the food sector, in cooperation with the Turkish Ministry of Industry and Technology and Development Agencies, within the scope of **"COVID-19 Crisis Response and Resilience Project"** financed by the Japanese Government and conducted by the United Nations Development Program (UNDP), specific to 5 fragile sectors (Food, Machinery, Automotive, Textile and Logistics Industries), which are of key importance for the economy of Turkey and are expected to be highly influenced by the pandemic effects.

In the Food Sector analysis and guideline study, the triple sub-groups of Code No.10 (Processing of Food Products), which is the dual group of NACE classification used in the European Union, were taken as a basis. In the analysis study specific to the food sector in the TR21 Region, statistical and categorical data obtained from secondary sources, the results of the survey study, and focus group meeting were used. In this context, strategy and policy recommendations were planned for the sector.

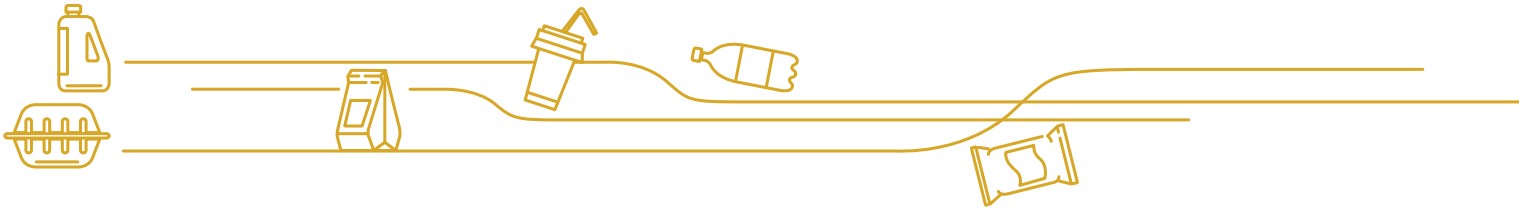
Present Situation

The food industry, developing on a labor-intensive system, is directly related to the utilization of agricultural products, the supply of raw materials to the industry, its contribution to employment and the balanced nutrition of the people, and it has strategic importance in socio-economic terms in all countries in the world.

Global agri-food trade is around 1.5 trillion USD. The share of agri-food trade in total commodity trade is on average over 7.5%. The share of upper-middle and lower-middle-income countries in global agri-food export increased from approximately 25% in 2001 to 36% in 2018. In the same period, the share of low-income countries in global agri-food export (1.1%) remained almost unchanged. Whereas the share of food in total agri-food export was about 70% in 2000, it reached up to 76% in 2018. In the period between 1995-2018, whereas food export grew by an average of 3.40% per year, agricultural commodity products increased by an annual average of 1.90%. Foreign trade balances in the continents contain significant differences. While the American continent increased its foreign trade surplus from 2000 to 2018, the foreign trade deficit in the Asian continent increased rapidly.

As for Turkey, according to 2018 data, 49.025 enterprises operate in the Food Industry. Micro enterprises constitute the largest segment with a total share of 86.8%. The share of Food Manufacturing Sector enterprises in manufacturing sectors is 12.4%. In the breakdowns of the Food Manufacturing Sector, it is seen that most of the employees (39.6%) are in the "Manufacture of bakery and farinaceous products" sector according to 2018 data. This is followed by "Manufacture of other food products" with 15.8% and "Processing and preserving of fruits and vegetables" with 13%. The majority of the enterprises (69%) operate in the "Manufacture of bakery and farinecous products" sector. This sector has a great share in the increase in the rate of micro-enterprises in the food sector. The Food Industry had a turnover of 59 billion USD in 2010. This value increased by 30.4% to 76 billion Dollars in 2014 and declined to 61 billion Dollars in 2018. In addition to exchange rate fluctuations, the decline in "10.7: Manufacture of bakery and farinecous products" and "10.1: Processing and preserving of meat and production of meat products" sectors had a significant effect on this decline. In the same period, "10.2: Processing and preserving of fish, crustaceans and molluscs", "10.3: Processing and preserving of fruits and vegetables", "10.4: Manufacture of vegetable and animal oils and fats" and "10.9: Manufacture of prepared animal feed" sectors showed an increase in the amounts of both "total added value" and "added value per employee".

"Fruit" (Edible fruit and edible nuts) and "Processed Fruits and Vegetables" (Vegetables, fruits, nuts, and preparations obtained from other parts of vegetables) have the largest share in Turkey's export. These are followed by the articles "Milling products, malt, starch, inulin" and "Preparations of cereals, flour, starch or milk, pastrycooks' products," whose export has greatly increased in



recent years, including the product "wheat flour," in which Turkey takes the lead and "pasta," in which Turkey comes in fourth regarding export in the world. Regarding the exports between 2010-2018, there was a significant decrease in the world export share of "Fruit", "Vegetables" (Edible vegetables and some roots and tubers) and "Miscallaneous edible preparations." On the other hand, the world export shares of the products "Wheat flour", "Pasta, cake/biscuit, bulgur", "Fish and Aquaculture" and "Vegetable Oils," have increased significantly. Although the shares of "Poultry" and "Eggs" in world export have increased significantly, the price-oriented competitive efficiency (added value per employee) in these sectors has decreased considerably.

The biggest share in imports is the raw materials of exports (flour, pasta, biscuits, vegetable oil) and feed (cereals, oilseeds, residues and waste of the food industry, vegetable oils). Import of "Livestock" has also increased significantly in recent years.

The countries to which Turkey exports the most agri-food products are Iraq, Germany, the USA, Russia, and Italy respectively. As for imports, Russia, Brazil, Ukraine, the USA, and Malaysia are respectively the countries with the highest shares. Economic and political uncertainties in Iraq cause unstable and volatile exports to this country, making it difficult for exporters to plan.

Thrace Region, which keeps the TR21 Region within, is located in an important transition zone between Europe, Asia, the Middle East, and the Former Eastern Bloc. Global transit routes and significant investments increase the importance of the region on a global scale. That TR21 Regionis the country's gateway to Europe, that it is close to metropolises, which are big markets, foremost being İstanbul, that it is the region least affected by climate change and the development of its industry create opportunities and competitive advantages. Thrace Region has wide and fertile agricultural areas. It is one of the important agricultural production centers of the country with its experience. In Thrace, where agricultural mechanization is high, yield rates are also above the country average.

The main crop production items of the TR21 Region are canola, paddy, sunflower seed, forage peas, wheat, vetch, wheat-greenery, meadow grass and triticale, and aromatic plants lavender and sage. Fruit and vegetable production is low in the region. The most important item in fruit is grape for wine. In animal husbandry, pure culture dairy cattle and merino sheep come to the fore. Since the Thrace region is declared a free zone and modern animal breeding is carried out in the region, it becomes important for the production of meat and dairy products with high added value. Firms engaged in agriculture-based industrial production in Edirne have intensified their investments in paddy, oil, milk and dairy products sectors. Kırklareli is a major producer in agricultural production, foremost being oil seeds, and animal breeding. The agriculture-based industry, which includes dairy products, vegetable oil plants, meat processing plants, and flour manufacturing, has developed in the province. In Tekirdağ, oil and fat manufacturing, milk, and dairy products sectors stand out in food. Although the foodindustry has developed in TR21 Region, it ranks third in size after the textile and clothing sectors in terms of the number of employees in the region. It has a 3.1% share regarding the number of workplaces in Turkey and a 3.2% share regarding the number of employees. The region has a deficit in foreign trade in agri-food products. Flour has the largest share in exports (milling products, malt, starch, inulin, wheat gluten article). This is followed by various food preparations, sugar and sugar products. Grain and oilseeds have the biggest share in imports.

Within the circular economy although there is a plant for processing whey, which is the waste of dairy enterprises in the TR21 Region, this plant is idle. Considering that the facilities in other provinces of the country work efficiently, it is important to identify and solve the problems of the facility in the region and to operationalize it. In this way, it will be possible both to reduce environmental pollution and to increase added value. Despite the expected increase in temperatures due to global climate change, the region is predicted to be the least affected by climate change in Turkey.

Findings

156 enterprises participated in the survey conducted within the scope of this study, which is aimed at the analysis of the companies. According to the results of the survey, the competencies of companies in Quality Management are higher compared to other subjects. **Priority areas to be developed** stand out **as access to the market/ export competences, the amount of differentiated and value added and R&D / innovation activities that contribute to it. In this respect, the ability to increase and retain qualified personnel (human resources management), developing university-industry cooperation, and enriching information resources** are the competencies that should be brought in companies. **Difficulties in accessing finance** constitute the bottleneck that forces companies the most.

The COVID-19 pandemic has impacted all links of food supply chains, simultaneously affecting field production, food processing, shipping and logistics, and final demand. Naturally, not all sectors and products are equally affected, but each product has been found to be disrupted at different stages of the supply chain:

a. Production in the field faced bottlenecks in terms of some inputs, and limitations on the mobility of the workforce have negatively affected the availability of seasonal workers for planting and harvesting in the fruit and vegetable sector in many countries.

b. Food processing has been interrupted by labor shortages and shutdowns. COVID-19 has created disruptions in food processing industries due to rules regarding social distancing, labor shortages stemming from the disease, and measures taken to contain the spread of the virus.

c. Bottlenecks in shipping and logistics have disrupted the movement of products through supply chains. Air transport in particular has been severely interrupted. The disruptions in container and truck transportation have also created problems, although less often. Transport and logistics problems were most prominent for perishable high-value products such as fruit and vegetables. The grain supply did not encounter major disruptions.

d. COVID-19 has led to a dramatic shift in consumer demand, ranging from restaurants, catering, and other "food-away-from-home" types to food consumed at home, making significant changes in the way food supply chains operate. There has been a significant increase in e-commerce.

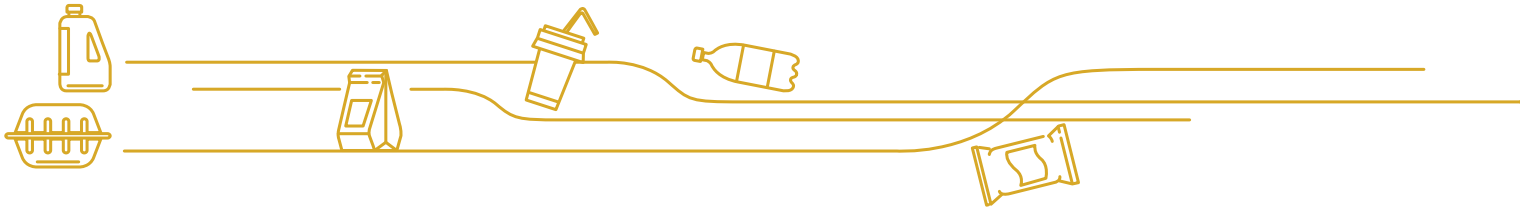
e. Retail food demand has increased. Frozen and packaged food sales in particular increased dramatically. There has been an increase in demand for foods considered to be healthy and immune-boosting.

f. Those who were deprived of the opportunity to eat at the university, at school were adversely affected. The severity of the difficulties in low-income families' access to food has increased over the course of the pandemic. Despite various problems experienced after COVID-19, it has been observed that the main problem does not stem from the production but the distribution of the product to the needy.

In the survey study, it was seen that the declines in turnover, production, and profitability of companies were the most prominent effects of COVID-19. Some companies reported that their turnover increased. Although turnover trends vary by sector and companies, among the enterprises surveyed, a decline was observed in most companies, excluding the Vegetable Oil sector. The perceived severity of the adversities caused by COVID-19 in companies was respectively stated as "Demand Fluctuations", "Key Workforce Loss" and "Temporary Factory Closures". However, according to the survey, companies think that “Exchange rate fluctuations” and “lack of funding” are factors affecting businesses more severely.

In this context, the main threats originating from COVID-19 are classified below:

- Import's getting difficult and disruptions in input supply rendering production difficult
- Supply risk ensuing especially due to the export restriction of grain and oilseed exporting countries
- Difficulties in procuring agricultural workers



- Difficulties in logistics and distribution of food
- Vulnerable groups (elderly, poor, etc.) having difficulty in accessing food
- With the cessation of exports, the risk of deterioration of the products that cannot be exported, such as fruits and vegetables
- With the closure of hotels, restaurants, and cafes, decline in the sales of these enterprises and those who sell products (meat, milk, fish, etc.) to these enterprises

Recommendations

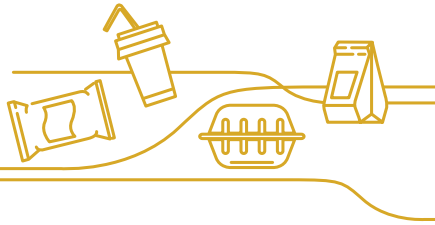
The result of the analysis suggests that the main problem in Turkey's agricultural production is **low productivity**. In order to increase efficiency, many methods such as scale economy, use of technology, access to up-to-date information and application of knowledge, R&D activities aimed at innovativeness, and the generation of new knowledge should be used.

It is thought that mechanisms should be designed for the actualization of these factors in the development of policies in the agri-food sector. In this context, the difficulties in accessing data and information constitute one of the most important gaps. **Data and information flow between all stakeholders in the value chain** extending from agricultural inputs to the end consumer must be provided without interruption. Access to information by individuals and small businesses is particularly costly due to time constraints. This problem can be solved with institutional structures. Collaborations such as cooperatives and clusters may contribute to the elimination of the **information asymmetry** between them and other actors in the value chain by enabling agricultural producers and enterprises to access information from a single center. Likewise, productivity can be increased by providing the opportunity to act jointly (joint planning, production, purchasing, etc.) and **scale asymmetry** between them and other stakeholders in the value chain (such as suppliers and customers) is also decreased and the sanction power is increased. **Information and scale asymmetry** improvement will also contribute to the prevention of oligopolistic structures and cartel behavior. Establishing databases and providing transparent, fast, and uninterrupted information to stakeholders, developing cooperation with universities and research institutions stand out as other necessary mechanisms for access to information.

Although productivity is not considered as the main problem in the food products processing sector, the improvement in agricultural production will contribute to the reduction of enterprises' procurement risks in terms of supply, price, and quality. The proposed mechanisms will also contribute to **solving the problem of information and scale asymmetry, creating market diversity and increasing value-added production.** Ensuring the flow of information will support **effective planning** of the central authority and its rapid intervention in the problems and crises experienced in the market.

It becomes important to implement a market pull model for both agricultural producers and businesses. (That the seller/exporter closely follows the needs and demands of the customers and conveys the information to the producer/business, that the industry experts and universities provide the know-how information to the investor/producer to enable production in line with these, that the investor is provided with investment supports in this direction, that the investor/producer develops cooperations with universities aimed at R&Di etc.). In this context, it becomes important to establish mechanisms/supports for the establishment of cooperation for investment, financing, know-how, production, marketing, and R&D activities aimed at agricultural producers and food enterprises. When developing strategies, the concepts that should be considered as the top priority are thought to be **productivity, innovation and ensuring uninterrupted flow of information in the value chain.**

The main short, medium, and long term, national and regional strategy recommendations, aimed at providing solutions to the various problems in the Agri-Food Sector (e.g. inefficiency in agricultural production, wrong practices in agriculture, agricultural labor shortage, water scarcity, climate change, weak cooperation among sector stakeholders, price-oriented competition, lack of market diversity, low R&D and innovation activities) and the changes and problems caused by COVID-19 are as follows:



- Providing central planning and coordination
- Supporting cooperation
- Increasing productivity and Added Value in agricultural production and Food Businesses
- Developing market access mechanisms
- Improving financing support mechanisms
- Increasing the skills and competencies of Human Resources
- Increasing the level of social life in the countryside
- Strengthening the Food Safety and Security System
- Ensuring social equality
- Ensuring efficient use of water resources
- Ensuring the recycling of wastes
- Ensuring adaptation to climate change
- Reducing food losses

Measures, the main of which are indicated below are directly related to COVID-19 and are covered in the subheadings of the main strategies and actions:

- The Urban Agri-Food Council and the Crisis Committee within the Council will accelerate the flow of information and communication between stakeholders in the value chain, ensure cooperation, increase the effectiveness of the measures, and contribute to the making of crisis period planning and the prevention of panic.
- Negotiations with international stakeholders (foremost being neighboring countries and countries with which intense food trade is plied) regarding crisis periods will support the solution of supply and export problems and contribute to effective planning.
- It is considered that the measures to set up a Digital Logistics Center, Food Banks, Neighborhood Bazaars design taking into account the risk of contamination, supporting the Cold Distribution Chain, and supporting Licensed Warehouses will ensure efficient distribution planning. The development of e-commerce infrastructures will also support the process.
- The Agricultural Information Platform and Consumer Information Platform will contribute to the access of institutions, producers, and enterprises to data and information, and contribute to effective planning and prevention of panic.
- By creating a crisis fund, it is aimed to prevent social damage by supporting those who suffered from the crisis, to financially support agricultural producers and workers, and to ensure production by meeting the agricultural workforce needs through directing migrants to agricultural work.
- Supporting R&D and investment projects for the production and development of packaged and shelf-stable products, whose importance was understood in the pandemic, will both help prevention of panic and accessing healthy products.
- Supporting R&D and investment projects for the domestic production of agricultural inputs will reduce the supply risk in agricultural production, and ensuring the efficient use of water resources will contribute to the sustainability of agricultural production. Climate change adaptation fund will be used to support projects needed for the sustainability of agriculture.

Considering the analyses, it is thought that productivity studies, product and market diversity should primarily be increased in TR21 region, that companies should steer away from pricewise competition and improve their competencies in branding goal and in the fields of quality, marketing and R&D.

1. INTRODUCTION

The closure and/or restriction measures taken in our country, as well as in the whole world in order to slow down the spread of the COVID-19 pandemic have started to negatively affect industrial production and foreign trade activities as of mid-March 2020 and their negative effects on economic parameters were observed to intensify as of April. In this context, comprehensive new markets research, sectoral impact analysis studies and training/consultancy activities are **carried out within the scope of "COVID-19 Crisis Response and Resilience Project,"** funded by **the Government of Japan** andcarried out by **the United Nations Development Program (UNDP),** in cooperation with **TR Ministry of Industry and Technology** and **Development Agencies and** specific to **5 fragile sectors (Food, Machinery, Automotive, Textile, and Logistics)** expected to be highly affected by the pandemic.

Within the scope of the sectoral impact analyses, which is an important pillar of the **"COVID-19 Crisis Response and Resilience Project,"** a study was conducted, in which the current situation of the actors in the relevant sectors (especially SMEs) during and after the COVID-19 impact were revealed, the future strategies were defined in line with global trends and current situation analyses and sectoral and national/regional short, medium and long term strategies and policy recommendations were defined in order to contribute to the development of more inclusive and sustainable business models for SMEs.

Within the Food Industry, 7 Level-2 Regions were included in the project:

- TR61 - (Antalya, Isparta, Burdur)
- TRC3 - (Mardin, Batman, Şırnak, Siirt)
- TR22 - (Balıkesir, Çanakkale)
- TRA1 - (Erzurum, Erzincan, Bayburt)
- TR52 - (Konya, Karaman)
- TR21 - (Tekirdağ, Edirne, Kırklareli)
- TR33 - (Manisa, Afyonkarahisar, Kütahya, Uşak)

In the Food Industry analysis and guideline study, the triple sub-groups of Code No.10 (Processing of Food Products), which is the dual group of NACE classification used in the European Union, were taken as a basis:

Table 1: *Food Sector NACE Classification*

NACE CODE	Explanation
10	**Manufacture of Food Products**
10.1	Processing and storage of meat and manufacture of meat products
10.2	Fish, crustaceans and mollusks processing and storage
10.3	Processing and storage of vegetables and fruits
10.4	Vegetable and animal oils and fats
10.5	Manufacture of dairy products
10.6	Manufacture of ground grain products, starch and starch products
10.7	Manufacture of bakery and bakery products
10.8	Manufacture of other foodstuffs
10.9	Manufacture of ready animal feeds

This report has been prepared for the Food Industry in the TR21 Region. Desk works (research reports, statistical databases, etc.) and field studies (surveys, focus group interviews, work group meetings, interviews with industry experts) were conducted. In consequence of the analyses, the changes and inclinations before and after COVID-19 in the whole world, in Turkey, and in the relevant regions were examined and the challenges, threats, and opportunities imposed on companies by the changing circumstances were treated and evaluated. Considering these trends and changes, solutions were offered and strategies and action plans were developed.

2. METHODOLOGY

The workflow diagram used in the work carried out within the scope of the project was shared in Figure 1.

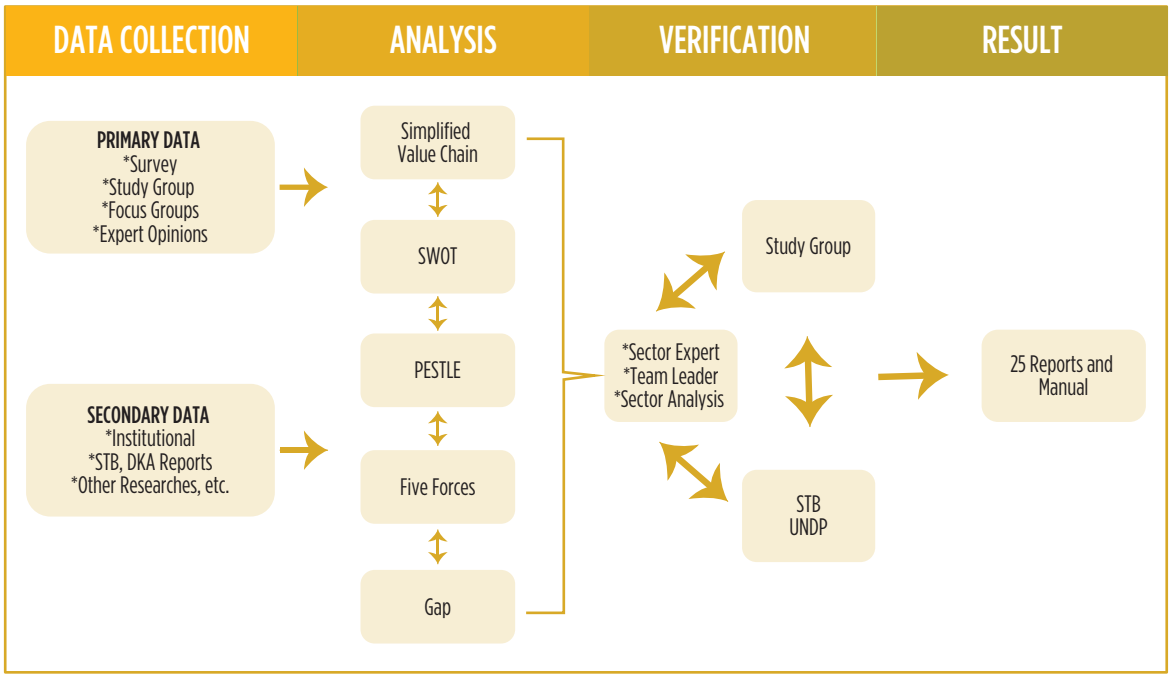


Figure 1: *Methodology Work Flow Diagram*

The preparation process of the content of the regional Food Industry evaluation report prepared within the scope of the project was carried out depending upon three main activities. These are respectively;

A. Data Collection

All meetings held during the data collection processes were held online due to pandemic conditions, and the opinions and suggestions of selected large-scale companies, which are the current/potential customers of many SMEs and experience at first hand all the components in the value chain specific to SMEs were also considered. Both primary and secondary research methods were used in the data collection process.

1. Primary Research Methods

i) Survey Study: Sector-specific up-to-date data, which could not be collected from secondary sources, were obtained through surveys. With the online survey study prepared for "Fragile Sectors Analysis", it was announced to the relevant sector stakeholders by different institutions and organizations, foremost being Development Agents. Since the announcements were made through many channels in order to increase the participation of SMEs in the relevant sectors in the survey, the sample selection of the companies to fill out the survey was not possible during the implementation phase of the survey. However, after the survey was carried out, the answers obtained from the questions were filtered in line with a sample, and their details were shared in the 6.1.1. Section of the report.

ii) Work Groups: Regarding 7 reports to be prepared for the food industry, 7 experts from 7 Development Agencies (BAKA, DİKA, GMKA, KUDAKA, MEVKA, TRAKYAKA, ZAFER) operating in the relevant regions were added to the work group, they examined the studies made by the sector expert and gave support in the validation processes of the prepared analyze, inferences

and policy/strategy proposals. During the 14-week work period following the preparation of the inception report, the work group meetings were held every two weeks, six times in total.

iii) Focus Group Meetings: One of the important qualitative information sources of the primary research was considered as focus group meetings and leading decision-makers (OIZs, CCOs, clusters, key main and sub-industry manufacturers, NGOs) in determining and prioritizing policy/strategy recommendations for the sector., etc.) were included in the process and their opinions were collected. Detailed participant list of the relevant focus group meetings is shared in Appendix-2.

iv) Expert Opinions: In addition to the issues expressed by the participants at the meetings, the opinions of experts from different institutions and organizations who know the sector/region well were also evaluated.

3. Secondary Research Data

i) Institutional Data Sources: Data collected from institutions such as FAO, World Bank, OECD, UNDP, INTRACEN, World Trade Organization, SSI, TURKSTAT, TR Ministry of Commerce were used (Annex-4).

ii) Reports Prepared by the Ministry of Industry and Technology and Development Agencies: The reports prepared within the Ministry of Industry and Technology and by Development Agencies on the development of the food sector examining the effects of COVID-19 were studied and used as a reference document.

iii) Other Researches, Publications, Reports: The reports prepared by professional organizations, umbrella organizations, etc. were examined. For example, the reports and studies prepared by professional institutions such as TÜSİAD, TGDF, TARMAKBİR were used. The sectoral reports prepared by international consultancy firms such as Deloitte were also utilized.

B. Analysis and Interpretation of Data

In the studies carried out to determine the methodology and working method of the reports, the current situation analysis of the Food sector operating in the TR21 Region was carried out using the following analysis methods:

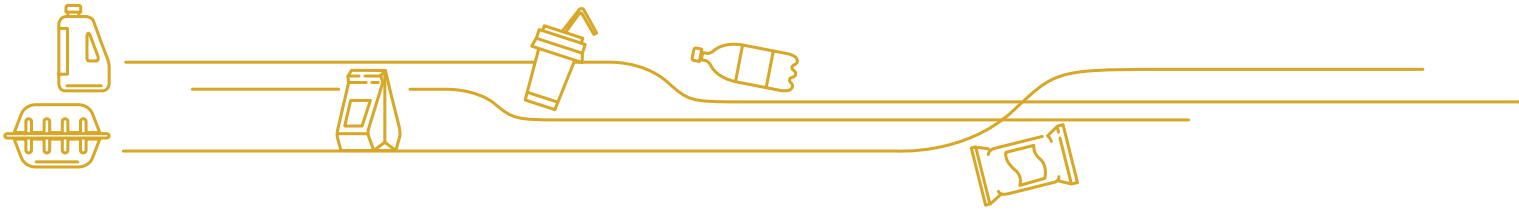
- Simplified Value Chain Analysis
- SWOT Analysis
- PESTLE Analysis
- Michael Porter's Five Forces Analysis
- Gap Analysis

Short, medium, and long-term strategy/action and policy recommendations were prepared in order to reduce and manage the risks and threats arising in the current situation analysis and to support and develop opportunities and positive practices using the primary and secondary data sources included in the data collection section. While some of the proposals prepared are macro-level issues that fall under the jurisdiction/responsibility of different institutions and organizations, some of them will be emphasized at the regional level and will serve as inputs to the studies of the Development Agency and other regional structures.

In addition, in the light of sustainable development goals declared by the UN, horizontal issues (resource efficiency, climate change, gender equality, crisis management) that cut the food sector were examined in detail and shared in the report.

C. Assessment and Reporting

After the food sector analysis prepared by considering regional dynamics, the effects of COVID-19 (Crisis Management) and other horizontal issues were examined, short, medium, and long term strategies and policy recommendations were presented in the report, and the steps to be taken were tried to be budgeted within the framework of certain assumptions.



3. Profile of the Food Sector

Today, when the "Food" issue is handled, all stages in the food production-consumption chain are meant (TÜBİTAK, 2010). The processing of agricultural and animal raw materials obtained as a result of primary production (animal husbandry, agriculture, fisheries) in the industry and the delivery of food to the consumer constitute the main steps of the chain. In accordance with the concept of "Food Quality, Safety and Security from Farm to Fork", it is important to ensure quality at every stage of the food chain, to form a society of healthy individuals and to increase the competitiveness of the food industry.

The food industry includes many different products such as meat, fruit, vegetables, dairy products, ready-to-eat food, and other edible products. However, agriculture and the food chain can be broadly divided into two categories in terms of capital investment and labor. The former can be defined as staple products such as wheat, corn, barley, soybeans, and oilseeds. The second includes high-value products such as fruit, vegetables, meat, dairy, and fishery. Basic products require a vast amount of capital investment. Unlike basic products, it takes a lot of effort to obtain high-value products (Aday S. and Aday M., 2020).

The food industry, developing on a labor-intensive system, is directly related to the utilization of agricultural products, the supply of raw materials to the industry, its contribution to employment and the balanced nutrition of the people, and it has strategic importance in socio-economic terms in all countries in the world (TSB,2019).

3.1. General View of the Food Sector in the World

Since the beginning of the twenty-first century, global trade has improved significantly in agricultural products and food (agri-food[1]), its trade value more than doubled between 1995 and 2018. Whereas global agri-food trade was US $ 680 billion in 1995, it reached up to US $ 1.5 trillion in 2018 and remained the same in 2019. During this period, the share of agri-food trade in total commodity trade was above 7.5% on average. The growth trend in the sector peaked in 2007-2008 with the food price crisis but was abruptly interrupted by the financial crisis in 2008, which was followed by the global recession. Trade improved in 2010 and 2011, and commodity prices rose again. Nevertheless, the slowdown in the global economy, which was felt more in developing economies such as the People's Republic of China, significantly affected trade and commodity prices. The decline after 2014 was mainly due to falling commodity prices. The growth rates of agri-food trade increased slightly between 2016 and 2018.

High-income countries take the highest share in terms of value in agriculture-food trade. However, since the early 2000s, countries with upper-middle and lower middle income have been increasing their share in global agri-food exports (Table). This ratio increased from approximately 25% in 2001 to 36% in 2018. In the same period, the share of low-income countries in global agri-food export (1.1%) remained almost unchanged.

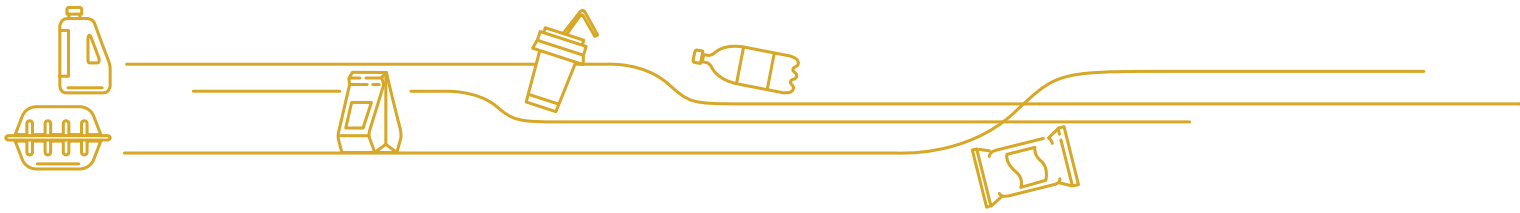
A large part of the agri-food trade includes processed food products of the food sector. The share of food in total agri-food exports did not change between 1995 and 2000. The share of food in total agri-food exports subsequently increased, reaching 76% in 2018 from nearly 70% in 2000. In the period between 1995-2018, whereas food export grew by an average of 3.40% per year, agricultural commodity products increased by an annual average of 1.90%.

Globally, most food is traded by high-income countries, and they usually export as much as the amount of imports. In all income groups, countries import, on average, more food products than agricultural commodities. Upper-middle and lower-middle-income countries with well-developed and export-oriented food processing industries export, on average, more than the food products they import. Agricultural commodities have a higher share in the exports of low-income countries, as they specialize in raw material production and their food industries are less developed (FAO, 2020a).

1- Agri-food trade includes agricultural products and food based on sections 01–24 of the Harmonized Commodity Description and the World Customs Organization Coding System (HS CODE). It largely corresponds to the definition of food trade as determined by the WTO World Trade Statistics Analysis including fish but excluding forestry and some non-food raw materials.

Table 2: *World Agri-Food Products - Export and Import - Billion USD - (SITC REV3 [0, 1, 22, 4])*

		Export (Million $) 2019	World Share		
			2000	2019	Tendency
	World	1.528.267	430.043	1.528.267	
	UN	553.999	40,58%	36,25%	↓
1	USA	135.950	12,64%	8,90%	↓
2	Holland	91.993	7,68%	6,02%	↓
3	Germany	80.664	5,77%	5,28%	↓
4	Brazil	76.346	2,98%	5,00%	↑
5	China	70.944	3,15%	4,64%	↑
6	France	69.347	7,73%	4,54%	↓
7	Spain	57.481	3,68%	3,76%	→
8	Canada	49.793	4,10%	3,26%	↓
9	Italy	48.099	3,41%	3,15%	↓
10	Belgium	44.075	3,94%	2,88%	↓
11	Argentin	38.265	2,67%	2,50%	↓
12	Mexico	36.507	1,90%	2,39%	↑
13	Poland	34.082	0,59%	2,23%	↑
14	Thailand	33.983	2,31%	2,22%	→
15	Indonesi	33.802	1,28%	2,21%	↑
16	India	33.665	1,26%	2,20%	↑
17	England	31.043	3,62%	2,03%	↓
18	Australia	29.497	2,93%	1,93%	↓
19	New Zeal	24.930	1,35%	1,63%	↑
20	Vietnam	24.917	0,85%	1,63%	↑
21	Russia	24.567	0,30%	1,61%	↑
22	Ukraine	22.029	0,31%	1,44%	↑
23	Malaysia	21.930	1,26%	1,43%	↑
24	Denmark	20.140	2,39%	1,32%	↓
25	**Turkey**	**19.394**	**0,82%**	**1,27%**	↑
26	Chile	18.252	1,03%	1,19%	↑



		Export (Million $) 2019	World Share		
			2000	2019	Tendency
	World	1.547.817	459.918	1.547.817	
	UN	513.921	36,69%	33,20%	↓
1	USA	158.677	11,14%	10,25%	↓
2	China	136.684	1,97%	8,83%	↑
3	Germany	98.326	7,77%	6,35%	↓
4	Japan	70.802	10,56%	4,57%	↓
5	Holland	67.005	4,60%	4,33%	↓
6	England	62.896	6,28%	4,06%	↓
7	France	60.670	5,28%	3,92%	↓
8	Italy	47.568	4,41%	3,07%	↓
9	Spain	41.801	3,08%	2,70%	↓
10	Belgium	38.033	3,25%	2,46%	↓
11	Canada	36.978	2,62%	2,39%	↓
12	SouthKor	31.100	1,68%	2,01%	↑
13	Russia	28.911	1,49%	1,87%	↑
14	HongKong	27.372	1,99%	1,77%	↓
15	Mexico	25.672	1,84%	1,66%	↓
16	Poland	22.278	0,65%	1,44%	↑
17	Vietnam	19.093	0,18%	1,23%	↑
18	India	19.026	0,50%	1,23%	↑
19	Indonesi	18.143	0,73%	1,17%	↑
20	UAE	17.838	0,66%	1,15%	↑
21	SaudiAra	17.587	1,17%	1,14%	→
22	Sweden	17.346	0,95%	1,12%	↑
23	Malaysia	15.852	0,77%	1,02%	↑
24	Australia	15.848	0,71%	1,02%	↑
25	Denmark	14.382	1,20%	0,93%	↓
26	**Turkey**	**14.373**	**0,46%**	**0,93%**	↑

Source: *World Trade Organization (WTO) https://data.wto.org/*

Foreign trade balances in the continents contain significant differences. While the American continent increased its foreign trade surplus from 2000 to 2018, the foreign trade deficit in the Asian continent increased rapidly (Figure 2).

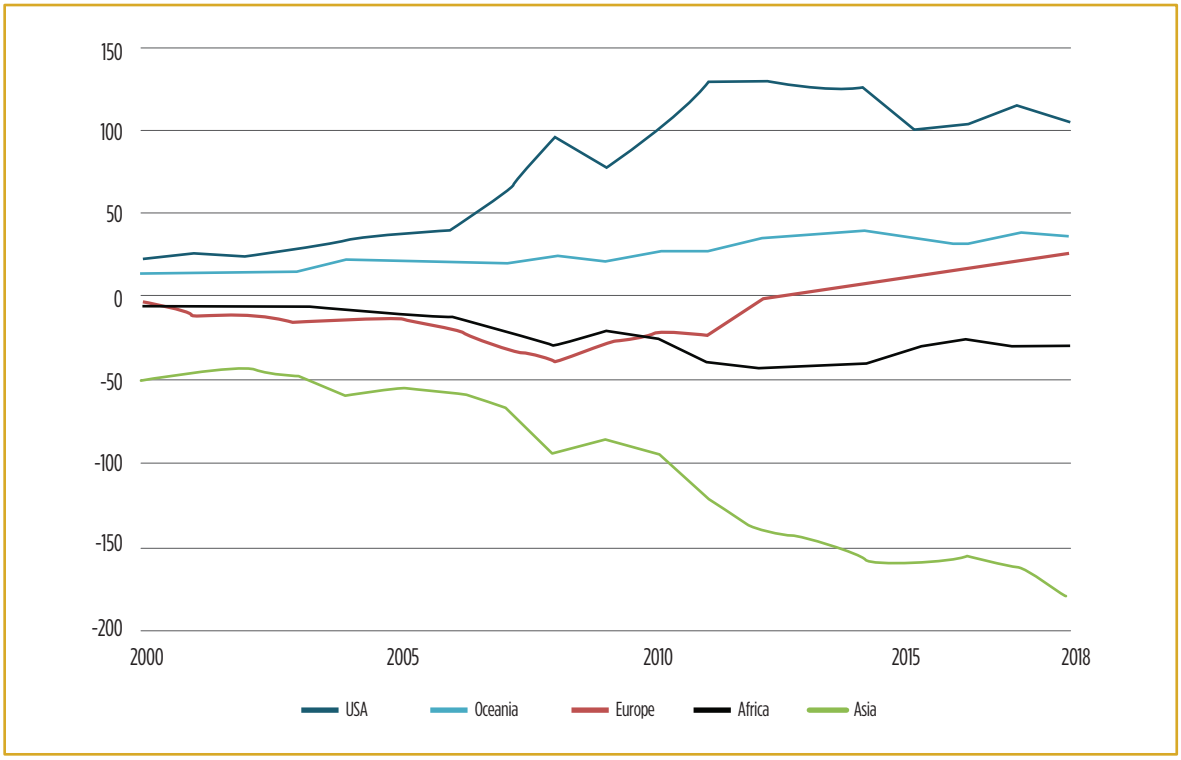


Figure 2: *Foreign Trade Balances in Continents*

Source: *Statistical Yearbook, World Food and Agriculture 2020, FAO*

According to 2018 Global export values, the most exported product groups with their approximate share in exports were as follows: Fruits and Vegetables (23%), Cereal and Cereal products (14%), Fish (11%), Meat and Meat products (11%), Beverages (8%), Animal and Vegetable Oils (6%), Dairy and Eggs (6%), Sugar and Honey (3%) and Other foods (16%) (FAO, 2020b).

While 1.05 billion people were employed in agriculture in 2000 (40% of total world employment), this amount decreased to 884 million people (27% of total world employment) in 2019 (FAO, 2020b).

According to the report prepared by OECD-FAO for the period between 2020-2029[2], the world population is expected to reach 8.4 billion people at the end of the period. It is predicted that economic growth will continue to spread unevenly around the world, with high per capita income growth in emerging markets. While both population growth and economic growth are the main drivers of demand for agricultural commodities, assumptions about continuous productivity growth and availability of resources are predicted to shape agricultural commodity production. While most of the primary agricultural production will be slightly affected by the COVID-19 pandemic, food processing disruptions, agricultural commodity trade, shifts in consumer demand, and seasonal labor shortages are expected to affect agriculture and fish markets, especially in the short term.

In addition to the population dynamics that are most influential in agricultural commodity demand, demand growth depends on the individual consumption patterns of the population. As a result of the global economic development, in all income groups, food expenditure per capita is expected to increase significantly in higher value items such as vegetable oils, livestock products, and fish (OECD - FAO, 2020).

2- Agricultural Outlook 2020-2029. OECD-FAO

Expectations regarding Food Products Global Market are as follows:

- That global turnover reaches 8 trillion USD in 2021,
- That turnover grows at an average annual rate of 3.14% between 2021 and 2025,
- That Confectionery and Snacks constitute the largest part of the market with 1.4 trillion USD in 2021,
- That China creates the largest market with a turnover of 1.3 trillion US dollars,
- Considering the total population, that per capita turnover is $ 1,067, and per capita consumption is 339 kg (Statista, 2021).

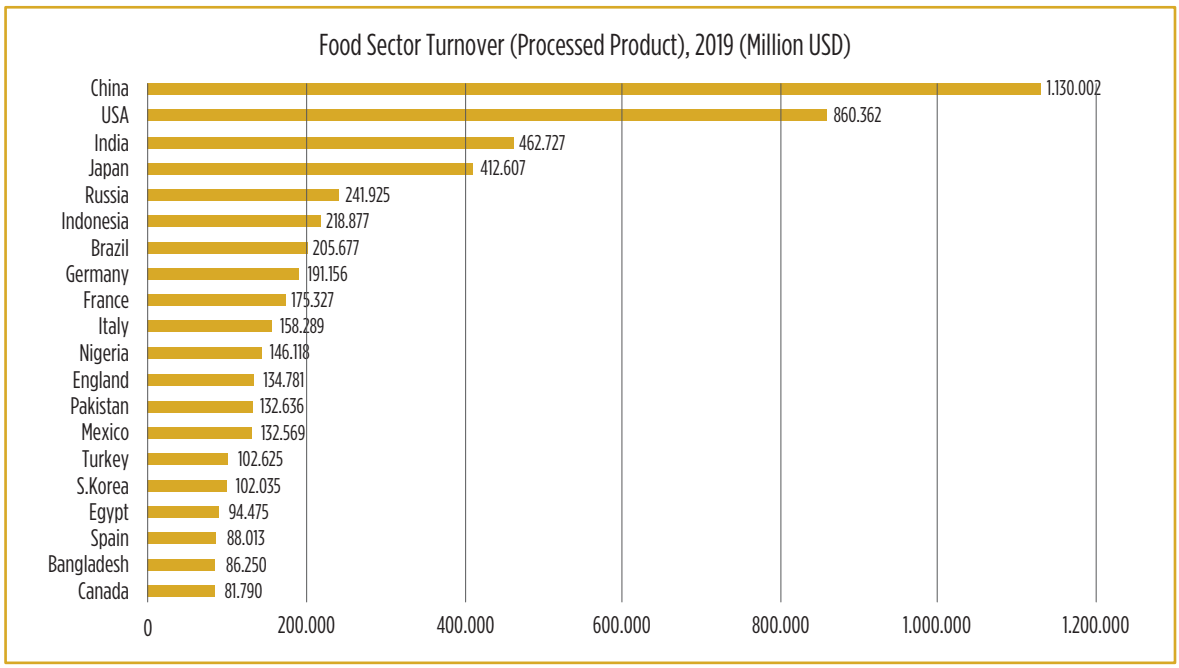


Figure 3: *World Processed Food Products Turnover*

Source: *Statista*

When the world 2019 export data are analyzed, it is seen that the USA, the Netherlands, Germany, Brazil, China and France share the first places in export amounts. In terms of imports, the USA, China, Germany, Japan, the Netherlands, and the UK made the highest amount of purchases. As mentioned above, the tendency of increase in the share of developing countries in international trade also applies to Turkey. Turkey's share in exports of world agri-food trade between the years 2000-2019 increased from 0.82% to 1.27%, and its share in imports increased from 0.46% to 0.93% (Table). The biggest share in the increase in exports and imports was the imported wheat's processing and being sold as flour and pasta.

The top five most exported products in the world according to the HS Code classification in 2019 are as follows (Table 2):

- Meat and edible meat offal : $ 135 billion
- Edible fruits and nuts : $ 127 Billion
- Soft drinks, spirits and vinegar : $ 124 Billion
- Fish and Aquaculture : $ 123 Billion
- Cereals : $ 110 Billion

Table 3: *World Agri-Food Products Export (HS Code 01-24) (1,000 USD)*

Chapter	Name of Product (Ranking: The most exported product in 2019)	Export - 1.000 $		Annual Average Increase Rate
		2010	2019	
	All products	1.157.856.913	1.587.466.497	3,57%
'02	Meat and edible meat offal	96.943.756	135.307.130	3,77%
'08	Edible fruits and nuts	75.854.898	127.367.450	5,93%
'22	Soft drinks, spirits and vinegar	86.986.456	124.243.065	4,04%
'03	Fish, crustaceans, mollusks and other aquatic invertebrates	81.840.266	123.633.107	4,69%
'10	Cereals	84.662.832	110.343.376	2,99%
'12	Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage	68.050.025	96.552.206	3,96%
'04	Dairy products, eggs, natural honey, other edible products of animal origin	70.338.709	89.224.106	2,68%
'15	Animal and vegetable fats and oils, edible fats, animal and vegetable waxes	81.514.611	88.941.869	0,97%
'21	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	47.334.142	78.914.063	5,84%
'19	Cereals, flour, starch or dairy preparations, pastry products	47.949.933	78.786.336	5,67%
'23	Residues and waste from the food industries, fodder prepared for the animals	56.247.197	75.996.699	3,40%
'07	Edible vegetables and certain roots and tubers	56.065.400	72.038.524	2,82%
'20	Preparations of vegetables, fruit, nuts and other parts of plants	47.635.769	63.729.605	3,29%
'16	Preparations of meat, fish, crustaceans, molluscs or other aquatic invertebrates	37.266.154	51.801.021	3,73%
'18	Cocoa and cocoa preparations	38.285.318	50.311.187	3,08%
'09	Coffee, tea, maté and spices	36.735.034	48.722.314	3,19%
'24	Tobacco and processed substances as tobacco substitutes	35.245.547	45.428.400	2,86%
'17	Sugar and sugar confectionery	44.721.236	39.937.113	2,00%
'01	Live animals	18.389.699	23.275.142	2,65%
'06	Live trees and other plants, tubers, roots and the like, cut flowers and ornamental foliage	17.791.111	22.379.611	2,58%
'11	Milling products, malt, starch, inulin, wheat gluten	14.303.599	20.235.790	3,93%
'05	Other products of animal origin (hair, bone, horn, ivory, coral, intestine, etc.)	7.097.264	11.101.163	5,10%
'13	Lacquer, gum, resin and other vegetable saps and extracts	5.684.586	8.056.025	3,95%
'14	Vegetable plaiting materials, herbal products not elsewhere specified or included	913.371	1.141.195	2,51%

Source: *www.trademap.org*

In this period, the sections with the highest export volume among the products with high trade volumes are as follows (Table 3).

- Edible fruits and nuts : 5.93%
- Various food preparations eaten : 5.84%
- Cereals, flour, starch or milk preparations, pastry products : 5.67%
- Fish and aquaculture : 4.69%
- Soft drinks, spirits and vinegar : 4.04%

3.2. General View of the Food Sector in Turkey

In Turkey, Food Products Manufacturing industry is one of the industries with the highest share in manufacturing industry. While it was in the second place according to the share it received in the manufacturing industry in 2018, according to the data of 2019, the Food Products Manufacturing Industry (Food Industry) made the highest turnover and took place in the manufacturing industry with a share of 13.6%. (Figure 4).

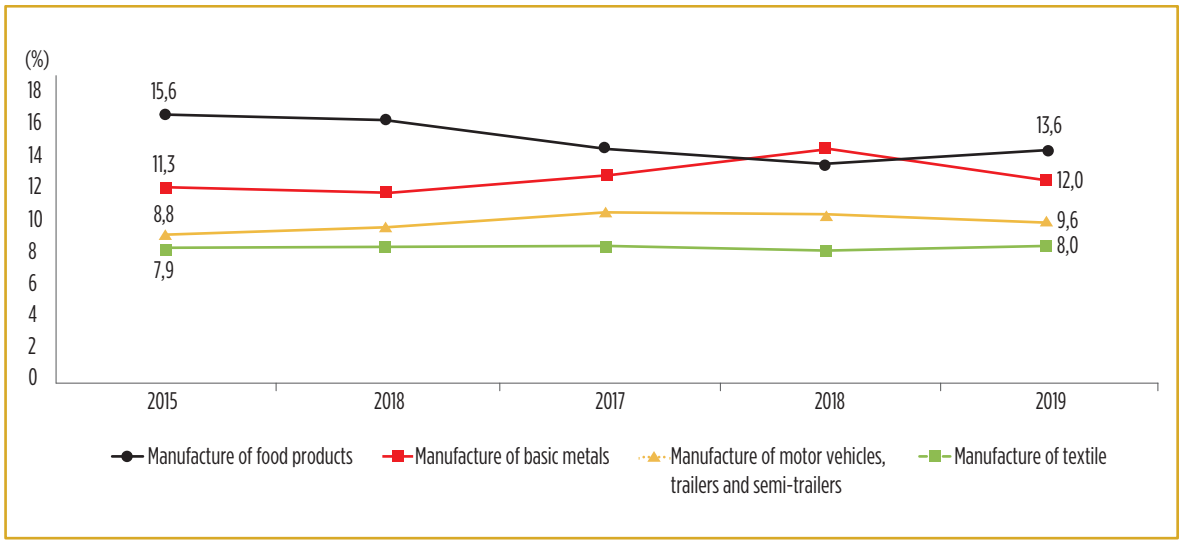


Figure 4: *Shares of Sectors in Manufacturing Industry (by Turnover)*
Source: *TURKSTAT*

According to 2018 data, 49.025 enterprises operate in the Food Industry. Micro enterprises constitute the largest segment with a total share of 86.8%. The share of enterprises in manufacturing sectors is 12.4%. The total number of employees is 514,971 and their share in the manufacturing sectors is 12.5% (Table 4).

Table 4: *Turkey Food and Manufacturing Industry Enterprise Number and Sizes (2018)*

		Food industry		Manufacturing Sectors		Turkey Total	
Number of Attempts	**Total**	49.025	100,0%	396.118	100,0%	3.160.371	100,0%
Number of Employees	1-9	42.557	86,8%	343.324	86,7%	2.956.224	93,54%
	10-49	5.249	10,7%	40.899	10,3%	170.666	5,40%
	50-249	963	2,0%	9.842	2,5%	28.274	0,89%
	250+	256	0,5%	2.053	0,5%	5.207	0,16%
Number of Employees	**Total**	**514.971**		**4.133.611**		**16.156.378**	
Number of Employees per Enterprise		10,5		10,4		5,1	

Source: *TURKSTAT (Excluding Agriculture, Forestry, Fisheries, Finance, and Insurance Sectors)*

In the breakdowns of the Food Manufacturing Sector, it is seen that most of the employees (39.6%) are in the "Bakery and flour products processing" sector according to 2018 data. This is followed by "Processing of other foodstuffs" with 15.8% and "Vegetable and fruit processing" with 13% (Figure 5). The majority of enterprises in the sector (69%) are those in the "bakery and flour products manufacturing" sector, followed by "Manufacture of other foodstuffs" with 7.3% and "milled grain products" with 6.4%. According to the number of employees per enterprise, the smallest sized enterprises are "Bakery and flour products production" with 6 employees per enterprise, and the largest is "Meat and meat products production" with 38 employees per enterprise (Figure 6). It is seen that most of the micro-enterprises consist of the "Bakery and Flour Products" sector.

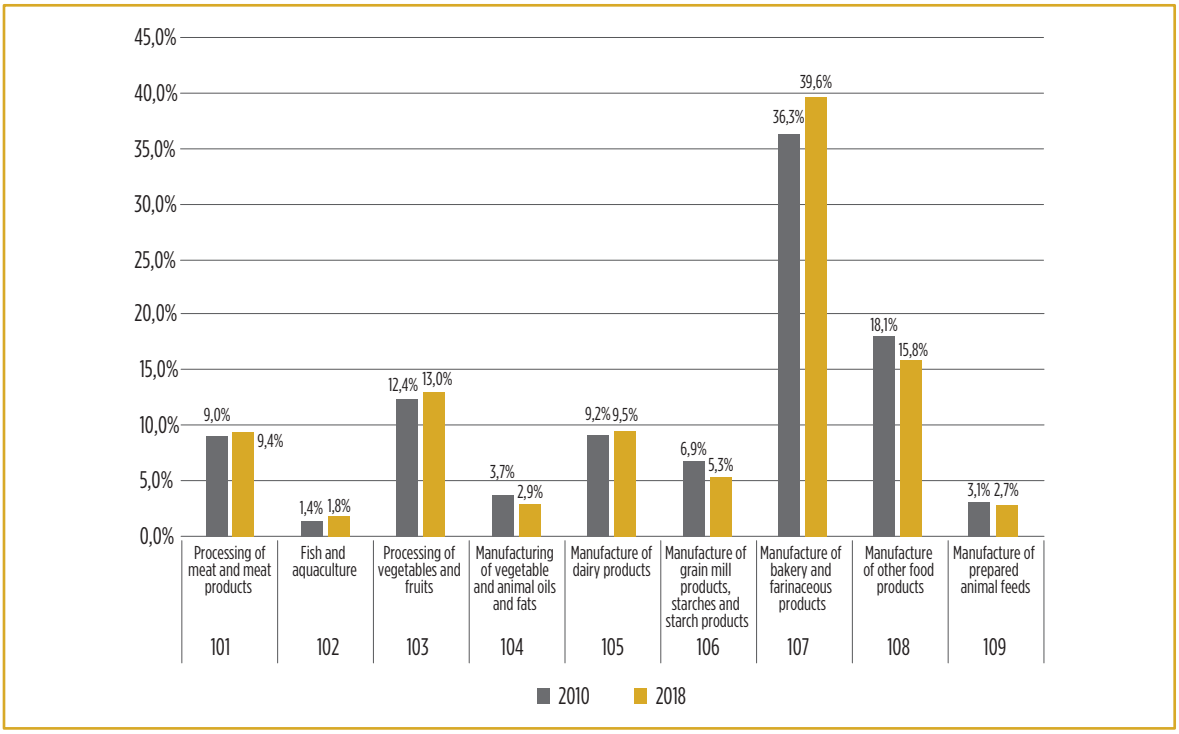


Figure 5: *Food Industry - Distribution of Employees by Sub-Sectors,*
Source: *Calculated based on TURKSTAT data*

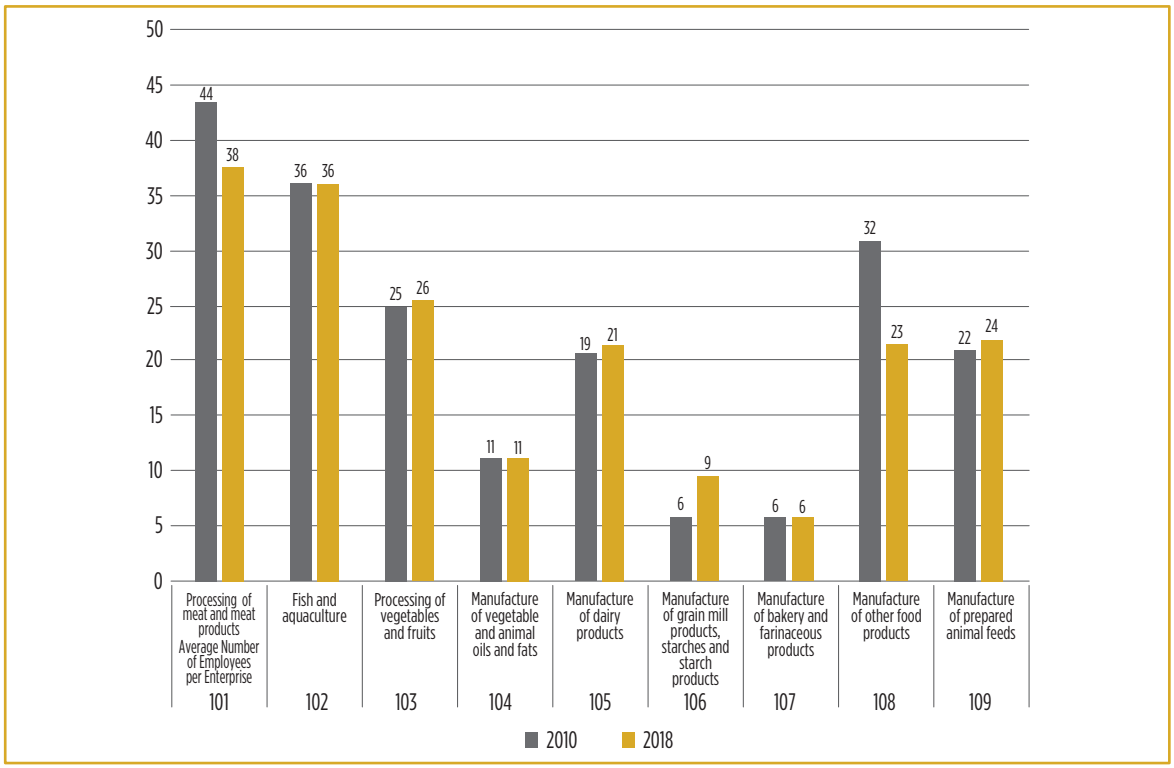


Figure 6: *Average Number of Employees per Enterprise*
Source: *Calculated based on TURKSTAT data*

The Food Industry had a turnover of 59 billion USD in 2010. This value increased by 30.4% to 76 billion Dollars in 2014 and declined to 61 billion Dollars in 2018. Factor Cost and Added Value amounts also showed a similar trend. In terms of TL, the turnover was 88 billion TL, 167 billion TL and 296 billion TL, respectively, in 2010, 2014 and 2018.

There has been a significant increase in the number of enterprises and employees in the Food Industry in the period between 2010-2018. In this period, the number of enterprises increased by 15,298 (increase rate 45.3%), and the number of employees increased by 161,380 (increase rate 45.6%) (Figure 7).

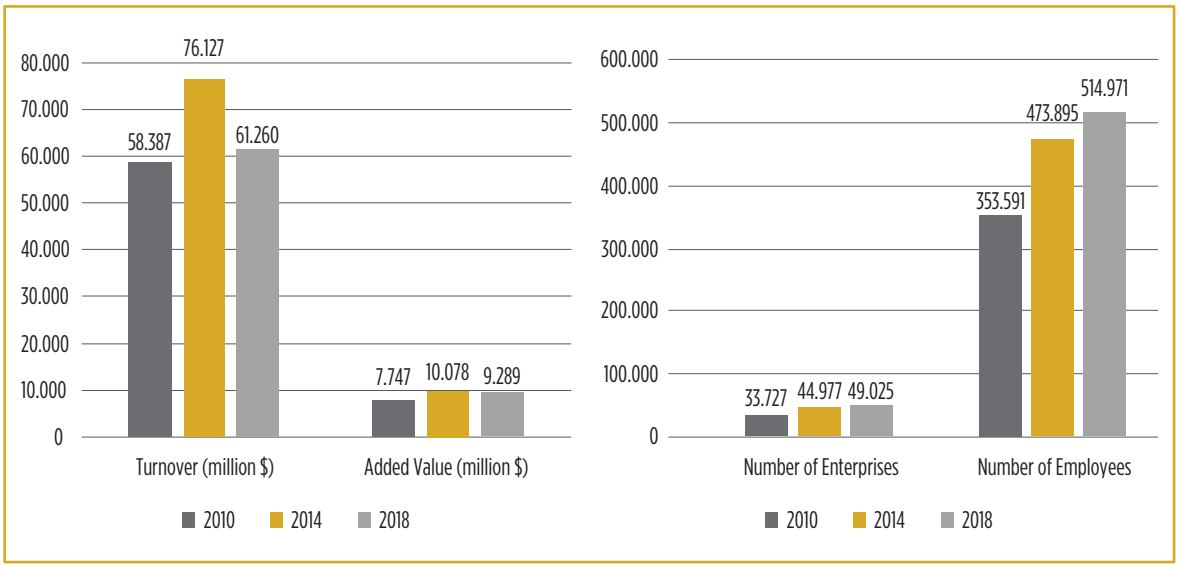


Figure 7: *Food Industry - Turnover, Value Added at Factor Cost, Enterprise, Employee Data (2010, 2014, 2018)*
Source: *Calculated based on TURKSTAT data*

While the share of the number of enterprises in the Food Industry in the Manufacturing Sector increased in the period of 2010-2018, the share of the number of employees remained the same (between 12.3-12.5%). This indicates that the sizes of newly established businesses are much smaller than the average of other sectors. When TURKSTAT data are analyzed, it is seen that the share of micro-enterprises in the increase in the number of enterprises in the period of 2010-2018 is 91%. Although the share of "number of employees" in the manufacturing sector of the food industry remained the same, the shares of "turnover" and "added value with factor cost" decreased. In parallel with this, in the 2010-2018 period, while the "added value per employee" increased at a low rate (0.8%) in the manufacturing sector, there was a high rate of decline, being 17.7% in the Food Industry. This data indicated a decline in productivity in the Food Industry sector relative to other sectors involved in manufacturing. However, it can be seen in the analyzes made based on sub-sectors that this situation is not valid for all sub-sectors (Figure 8).

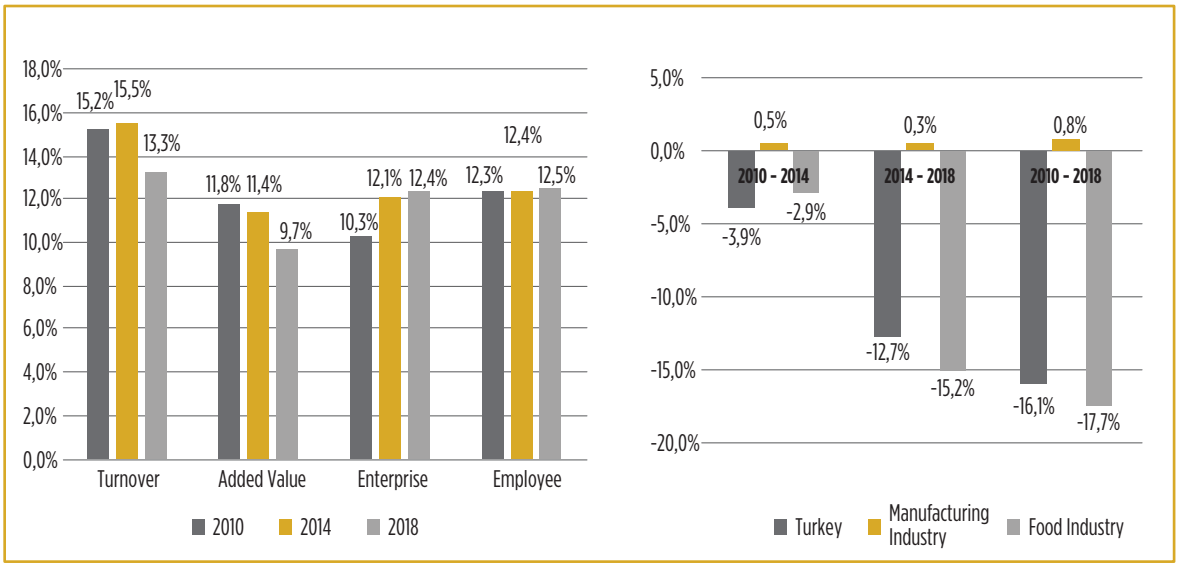


Figure 8: *Food Industry - its Share in the Manufacturing Sector and Change in Added Value per Employee*
Source: *Calculated based on TURKSTAT data*

In the Food Manufacturing Sector in 2018, 69.1% of 49,025 enterprises and 39.6% of 514,971 employees operated in the "10.7: Bakery and Bakery Products" sub-sector. A large part of the 15,298 increase in the number of enterprises in the Food Industry between 2010 and 2018 (12,145 enterprises) was also in this sub-sector. The "added value per employee" of this sector, which has a significant contribution to employment and total added value, is very low compared to other sub-sectors and decreased from 11.1 thousand USD to 8.9 thousand USD in the 2010-2018 period (Figure 9, Figure 10). Although there is an increase (31%) in the "added value per employee" in the "10.73 Pasta and similar bakery products manufacturing" sector, which is one of the subcategories of the industry, a significant decrease was observed in the other two subclasses (23%, 29%) (Annex 1). The classes that decreased the added value per employee are found to be "10.71: Bread, fresh pastry products and fresh cake production" and "10.72 Rusks and biscuits production, long-lasting pastry products and long-lasting cake production. Although the total added value created by these classes increased in US dollars, the decrease in the "added value per employee" played a major role in the decrease in the average of the Food Manufacturing Sector in this parameter (Figure 11).

It is thought that the increase in informal sales may also have been effective in the occurrence of this situation. That the increase in the number of enterprises between 2010-2014 (33.4%) compared to 2014-2018 (9%) is very high gives the impression that the Syrian migrants[3] who came to the country together with the start of the war in Syria in 2011 were effective. The fact that most of the entrepreneurs are interested in these low added-value sectors also shows that the entrepreneurs turn to business branches that do not need high-quality information and that can be established with low capital, as a consequence of the ongoing lack of vocational training mechanisms in the country and the difficulties in accessing finance.

In the "10.1: Meat processing and storage and production of meat products" sector, the radical decline in "Added Value" and "added value per employee" created between 2010 and 2018 in US dollars, had a significantly negative effect on the Food Sector average like the "10.7 Bakery and bakery products" sector. Among the sub-sectors of this sector, "10.12: Processing and storage of poultry" and "10.13: Manufacture of products made from meat and poultry" experienced the sharpest decline. When the export data of "Poultry meat and edible meat offal", with HS Code 0207 related to this sector (Trademap, 2021) are examined, it is seen that the country's largest export market for this product is Iraq with a share of 60%. Sales to Iraq have increased significantly in the last decade. However, as sales follow a fluctuating course, they pose a risk. At the same time, Turkey exported this product at a lower price compared to many of its competitors, even though it increased its share of world exports regarding this product in the last ten years. For example, while Turkey's export price per kg is 1, 25 US Dollars in "Poultry meat" according to the data of 2019, the export price per kg of Brazil, which has the biggest share of world exports is 1,63 US Dollars, the export price per kg of Poland, which is among the top exporting countries among the EU countries is 2,01 US Dollars and the export price per kg of Holland is 1,76 US Dollars. The export price per kg of Ukraine, whose export amount is closer to that of Turkey's was 1.40 US Dollars. Similar conditions are also valid for "Egg" with HS Code 0407.

These data indicate that Turkey's competition strategy in export is price-oriented in "Poultry" and "Egg" product groups, which coincides with the views of industry representatives in focus group meetings. It is thought that a detailed analysis of the sector and the preparation of a national strategic plan are needed in order to create market diversity, for the goal of products with high added value and the sustainability of the sector, to be able to increase competitiveness and take measures specific to the sector.

3- According to the 2019 data of the Immigration Administration General Directorate, around 3.6 million under temporary protection live in Turkey.

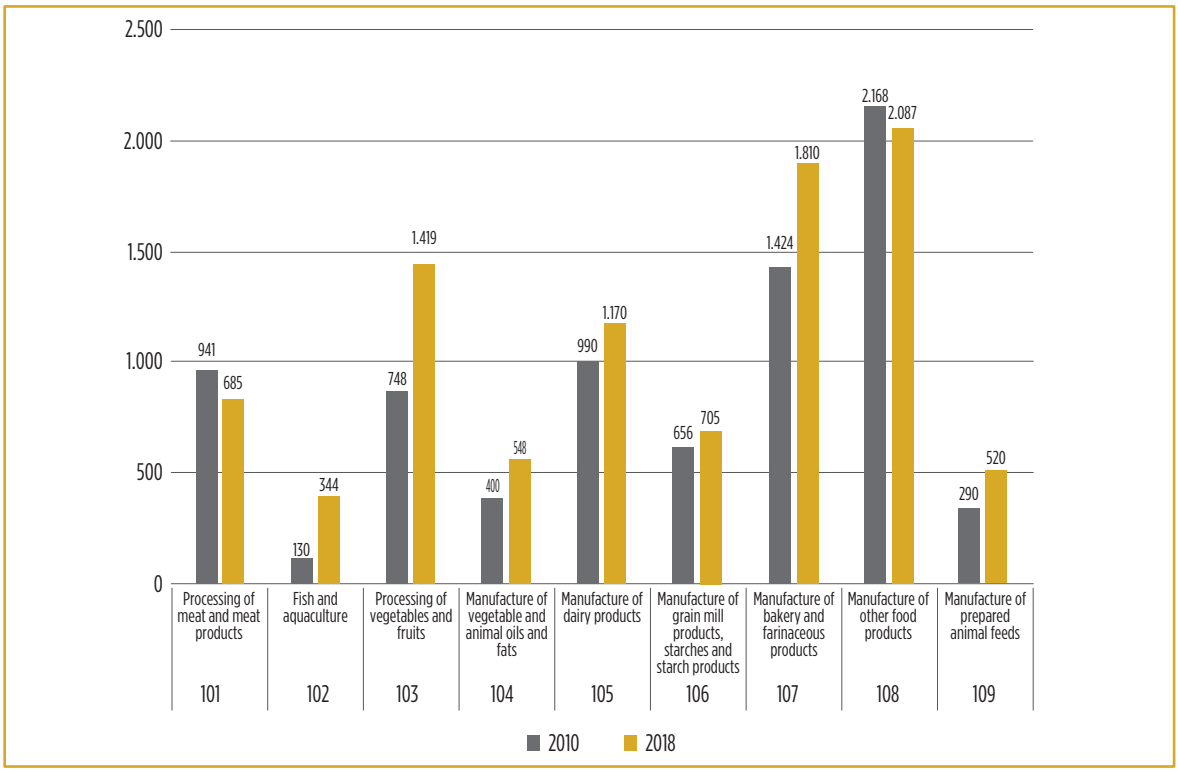


Figure 9: *Food Industry - Added Value in Sub-Sectors with Factor Costs (Billion USD)*

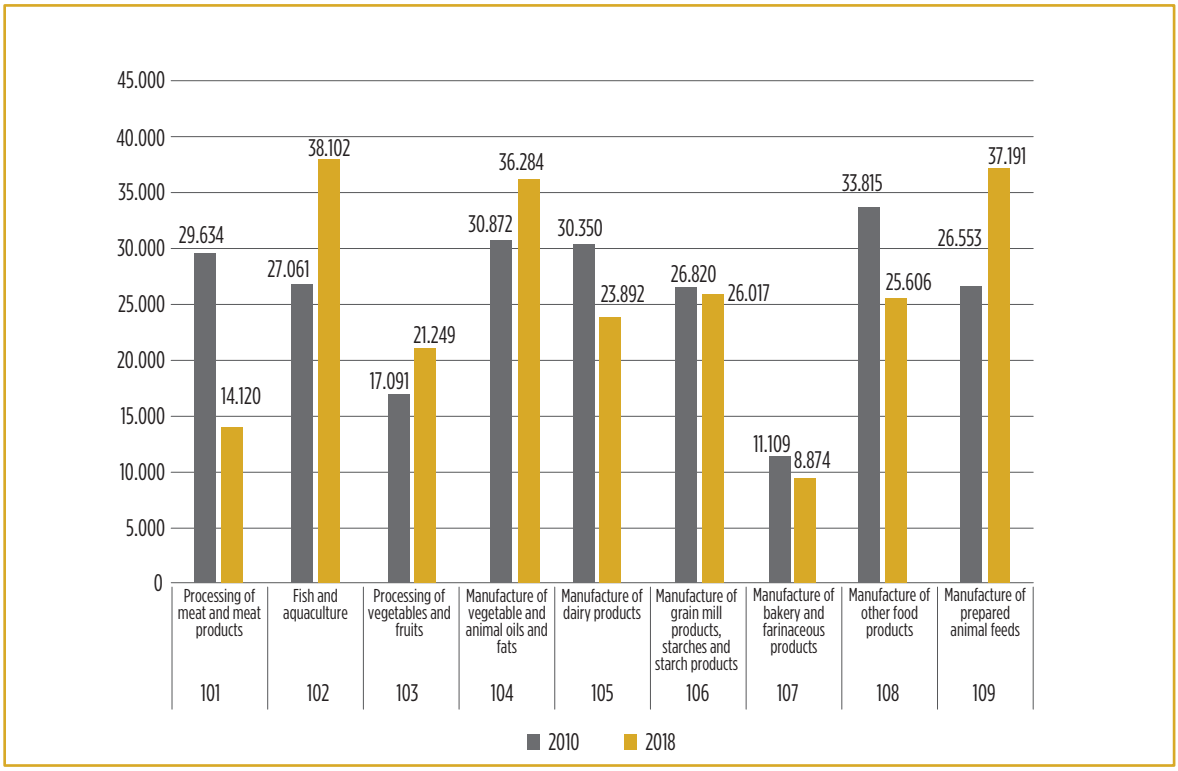


Figure 10: Food Industry - Added Value per Employee in Sub-Sectors

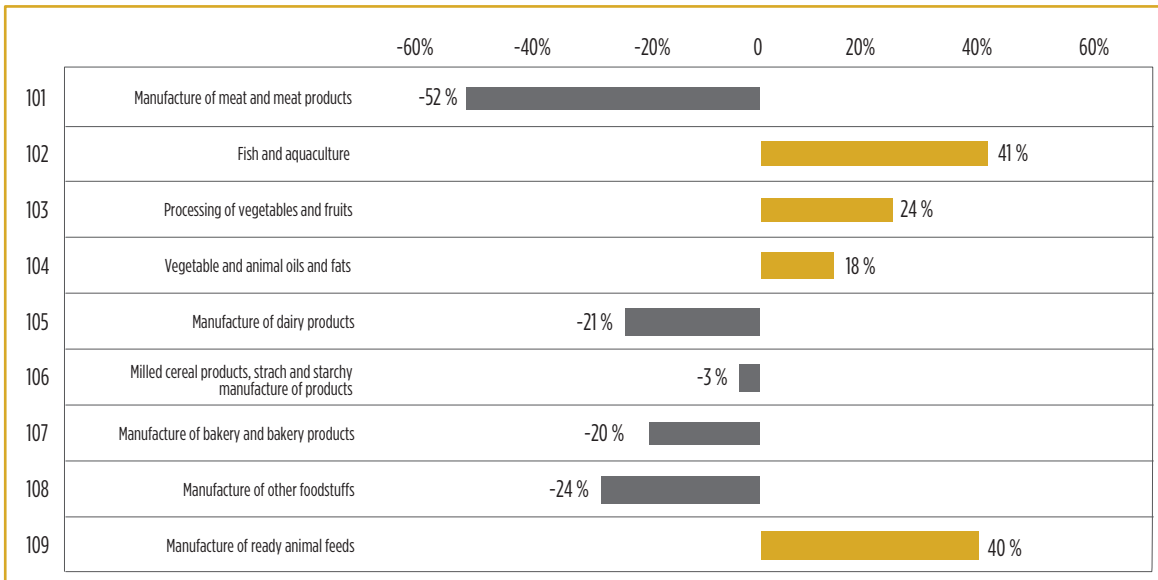


Figure 11: *Food Industry - Change of Added Value per Employee according to Sub-Sectors*

According to 2018 data, the sectors that create the highest "added value" are as follows:

- » "10.9: Manufacture of other food products "
- » "10.7: Manufacture of bakery and farinaceous products"
- » "10.3: Processing and preserving of fruit and vegetables"
- » "10.5: Manufacture of dairy products"

According to the 2018 data, the sub-sectors listed below, where the scale economy is more dominant stand out with high "added value per employee".

- » "10.42: Manufacture of margarine and similar edible fats" (81,171 USD)
- » "10.62: Manufacture of starch and starch products" (62,499 USD)
- » "10.32: Manufacture of vegetables and fruit juice" (42,895 USD)
- » "10.20: Processing and preserving of fish, crustaceans and molluscs" (38,102 USD)
- » "10.91: Manufacture of prepared feeds for farm animals" (37,867 USD)
- » "10.31: Processing and preserving of potatoes" (37,344 USD)
- » "10.73: Manufacture of pasta, noodles, couscous, and similar bakery products" (37,040 USD)
- » "10.81: Manufacture of sugar" (36,311 USD)

The sub-sectors given below displayed a successful performance with an increase in both "total added value" and "value added per employee".

- » "10.2: Processing and preserving of fish, crustaceans and molluscs"
- » "10.3: Processing and preserving of vegetables and fruits"
- » "10.4: Manufacture of vegetable and animal oils and fats"
- » "10.9: Manufacture of prepared feeds for farm animals"

Plant Production

In Turkey, the production of "Vegetables" and "Fruit, beverage, and spice crops" showed a significant amount of increase regularly between the years 2010 and 2019. In this period, the increase in the production of "fruit, beverage and spice plants" reached a high rate of 34.2%.

A fluctuating course was experienced in the production amount of "cereals and other vegetable products" in the same period. The increase in this period was slight with a rate of 5.1% remaining even behind the increase in population growth, being 12,8 %[4] (Table 5).

4- Calculated based on TURKSTAT data (Population; 2010: 73.7 Million, 2019: 83.2 Million)

Table 5: *Turkey - Plant Production Quantities*

Herbal Production (Thousand Tons)					
	2010	**2015**	**2019**	**Amount of Change (2010-2019)**	**Rate of Change (2010-2019)**
Cereals and other herbal products	60.689.356	65.077.326	63.802.117	3.112.761	5,1%
Vegetables	25.997.195	29.552.290	31.089.644	5.092.449	19,6%
Fruits, beverage and spice herbs	16.609.786	17.772.057	22.292.580	5.682.794	34,2%
Total	**103.296.337**	**112.401.673**	**117.184.341**	**13.888.004**	**13,4%**

Source: *TURKSTAT*

Animal Production

The number of bovine and ovine animals increased by 56% and 52% respectively between 2010 and 2019 (Table 6). The same trend is observed in eggs, poultry meat, and beekeeping) (Table 7, Table 8)

Table 6: *Turkey - Number of Bovine and Ovine Animals*

Number of Animals						
		2010	**2015**	**2019**	**Variation Amount (2010-2019)**	**Variation Ratio (2010-2019)**
Bovine	Total	11.454.526	14.127.837	17.872.331	**(2010-2019)**	56%
	Cattle	11.369.800	13.994.071	17.688.139	6.318.339	56%
	Cow	84.726	133.766	184.192	99.466	117%
Small cattle	Total	31.821.789	29.382.924	48.481.479	16.659.690	52%
	Sheep	25.304.325	23.089.691	37.276.050	11.971.725	47%
	Goat	6.517.464	6.293.233	11.205.429	4.687.965	72%

Source: *TURKSTAT*

Table 7: *Turkey - Poultry Data*

Poultry Data					
	2010	**2015**	**2019**	**Amount of Change (2010-2019)**	**Rate of Change (2010-2019)**
Egg (Million pieces)	11.841	16.726	19.898	8.057	68%
Poultry Meat (tons)	1.444.059	1.909.276	2.138.451	694.392	48%

Source: *TURKSTAT*

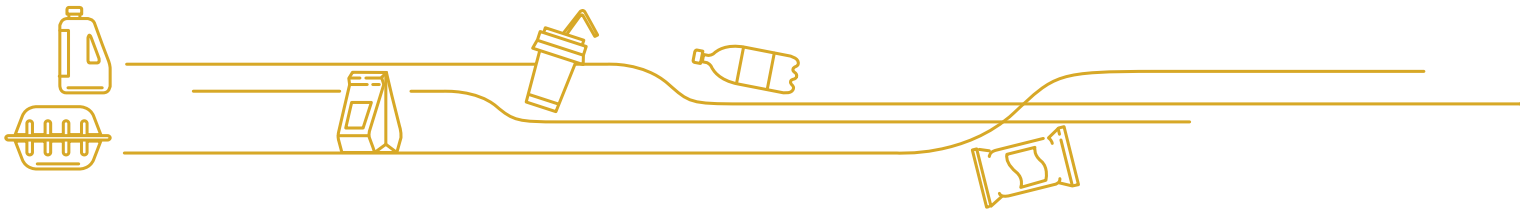


Table 8: Turkey - Beekeeping Data

Beekeeping Data					
	2010	2015	2019	Amount of Change (2010-2019)	Rate of Change (2010-2019)
Beehive (pieces)	5.602.669	7.748.287	8.128.360	2.525.691	45%
Honey (tons)	81.115	108.128	109.330	28.215	35%
Beeswax (ton)	4.148	4.756	3.791	-357	-9%

Source: TURKSTAT

Fish and Aquaculture

When the aquaculture production is evaluated, a low decrease (3%) in "sea fishing" and a high decrease (22%) in "inland water fishing" has been observed between 2010-2019. In the same period, the increase in "aquaculture" was very high (123%). Especially in "marine aquaculture", with a remarkable increase both in quantity and proportion, the production amount in 2019 reached almost three times the 2010 data (Table 9).

Table 9: Turkey - Aquaculture Production

Aquaculture Production						
		2010	2015	2019	Amount of Change (2010-2019)	Rate of Change (2010-2019)
	Total	653.080	672.241	836.524	183.444	28%
Hunting (ton)	Total (Hunting)	485.939	431.907	463.168	-22.771	-5%
	Sea	445.680	397.731	431.572	-14.108	-3%
	Inland Water	40.259	34.176	31.596	-8.663	-22%
Aquaculture (tons)	Total (Aquaculture)	167.141	240.334	373.356	206.215	123%
	Sea	88.573	138.879	256.930	168.357	190%
	Inland Water	78.568	101.455	116.426	37.858	48%

Source: TURKSTAT

Foreign Trade

Foreign Trade - Product Analysis

Turkey has maintained its position as a net exporter of Food Products in the 2010-2019 period. According to economic classes, the average annual export growth rate of the agri-food sector (4.5%) was higher than the import growth rate (4.2%), and the foreign trade surplus of 2.02 billion USD in 2010 reached 3.36 billion USD in 2019. The share of Food Products Manufacturing sector in total exports also increased from 63.5% to 71.8% in the same period. Significant success has been achieved in the "Fisheries and aquaculture" sector, with an annual average increase of 14.2% (Table 4).

In imports, unlike exports, the share of unprocessed agriculture-livestock products is higher than processed food products, and this item creates a significant foreign trade deficit. In Turkey, import aimed at the food industry largely consists of agricultural commodities, whose demand is mostly not met through production, whose import is restricted with customs duties and non-tariff barriers, and as necessitated by the inward processing regime (TÜSİAD, 2020).

Table 10: *Turkey - Agri-Food Foreign Trade According to Economic Classes (Import-Export-Foreign Trade Balance)*

NACE Code	Name	Export (1.000 $)		Amount of Change	Share in Exports		
		2010	2019	(2010-2019)	2010	2019	Annual Average Growth Rate
		11.764.452	**17.463.544**	**5.699.091**	**100%**	**100%**	**4,5%**
1	Crop and Animal Production, Hunting and Related Service Activities	3.962.541	4.112.899	150.358	33,7%	23,6%	0,4%
3	Fishing and Aquaculture	156.025	517.251	361.227	1,3%	3,0%	14,2%
10	Manufacture of Food Products	7.465.023	12.541.209	5.076.185	63,5%	71,8%	5,9%
11	Manufacture of Drinks	180.863	292.185	111.321	1,5%	1,7%	5,5%

NACE Code	Name	Import (1000 $)		Amount of Change	Share in Import		
		2010	2019	(2010-2019)	2010	2019	Annual Average Growth Rate
		9.734.909	**14.095.005**	**4.360.097**	**100%**	**100%**	**4,2%**
1	Crop and Animal Production, Hunting and Related Service Activities	5.918.958	8.805.962	2.887.005	60,8%	62,5%	4,5%
3	Fishing and Aquaculture	33.343	52.485	19.142	0,3%	0,4%	5,2%
10	Manufacture of Food Products	3.591.428	4.806.099	1.214.670	36,9%	34,1%	3,3%
11	Manufacture of Drinks	191.180	430.460	239.280	2,0%	3,1%	9,4%

NACE Code	Name	Foreign Trade Balance (1000 $)		Amount of Change
		2010	2019	(2010-2019)
		2.029.544	**3.368.538**	**1.338.995**
1	Crop and Animal Production, Hunting and Related Service Activities	-1.956.417	-4.693.063	-2.736.647
3	Fishing and Aquaculture	122.682	464.767	342.085
10	Manufacture of Food Products	3.873.595	7.735.110	3.861.515
11	Manufacture of Drinks	-10.317	-138.275	-127.958

Source: *Calculated based on TURKSTAT data*

When the agri-food foreign trade data are analyzed according to the HS CODE classification, it is seen that there is an increase in the foreign trade surplus in total (Table 11). The export performance of Turkey (average annual growth rate: 4.53%) remained above the world export growth rate (3.57%), through which its share in the world agri-food products increased from 1.04 % (2010) to 1.13% (2019) (Table 12).

Table 11: Agri-Food Products Total Foreign Trade according to Turkey HS CODE Classification (1000 USD)

(Chapter No: 1-24)	(1.000 $)		Amount of Change	Annual Rate of Change	Import Coverage Ratio	
	2010	2019	2010-2019		2010	2019
Total Exports	12.040.472	17.946.464	5.905.992	4,5%	157%	142%
Total Imports	7.682.821	12.652.049	4.969.228	5,7%		
Net Foreign Trade Balance	4.357.652	5.294.415	936.764	2,2%		

Source: *Calculated based on TURKSTAT data*

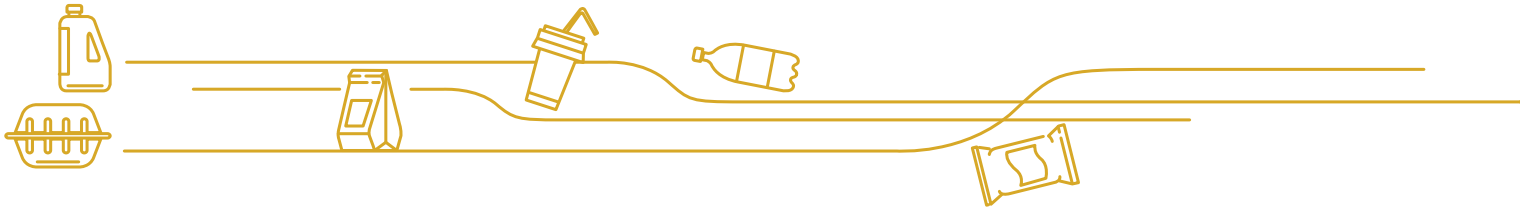
Table 12: Agri-Food Products Exports of Turkey by Chapter (1,000 USD)

		TR- Export (1000 $)		Amount of Change	Annual Average Rate of Change		Turkey's Share in World Exports	
		2010	2019		Turkey Export	World Export	2010	2019
"Chapter No"	Chapter name	12.040.472	17.946.464	5.905.992	4,53%	3,57%	1,04%	1,13%
8	Edible fruits and nuts	3.490.879	4.177.063	686.183	2,01%	5,93%	4,60%	3,28%
20	Preparations of vegetables, fruit, nuts and other parts of plants	1.491.356	2.006.449	515.093	3,35%	3,29%	3,13%	3,15%
19	Cereals, flour, starch or dairy preparations, pastry products	804.479	1.878.492	1.074.013	9,88%	5,67%	1,68%	2,38%
11	Milling products, malt, starch, inulin, wheat gluten	720.213	1.300.121	579.908	6,78%	3,93%	5,04%	6,42%
7	Edible vegetables and certain roots and tubers	1.107.483	1.044.395	-63.088	-0,65%	2,82%	1,98%	1,45%
3	Fish, crustaceans, mollusks and other aquatic invertebrates	312.928	962.233	649.305	13,29%	4,69%	0,38%	0,78%
24	Tobacco and processed substances as tobacco substitutes	697.027	906.487	209.460	2,96%	2,86%	1,98%	2,00%
15	Animal and vegetable fats and oils, edible fats , animal and vegetable waxes	458.236	871.865	413.629	7,41%	0,97%	0,56%	0,98%
21	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	554.692	692.469	137.777	2,50%	5,84%	1,17%	0,88%
18	Cocoa and cocoa preparations	430.928	649.163	218.235	4,66%	3,08%	1,13%	1,29%

4	Dairy products, eggs, natural honey, other edible products of animal origin	303.466	643.869	340.403	8,72%	2,68%	0,43%	0,72%
17	Sugar and sugar confectionery	387.421	616.982	229.561	5,31%	-1,25%	0,87%	1,54%
2	Meat and edible meat offal	208.012	586.176	378.164	12,20%	3,77%	0,21%	0,43%
12	Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage	182.887	383.048	200.162	8,56%	3,96%	0,27%	0,40%
22	Soft drinks, spirits and vinegar	229.518	343.319	113.802	4,58%	4,04%	0,26%	0,28%
23	Residues and waste from the food industry, roughages prepared for animals	27.335	219.489	192.154	26,04%	3,40%	0,05%	0,29%
9	Coffee, tea, maté and spices	103.447	167.585	64.138	5,51%	3,19%	0,28%	0,34%
16	Preparations of meat, fish, crustaceans, molluscs or other aquatic invertebrates	55.773	126.430	70.657	9,52%	3,73%	0,15%	0,24%
6	Live trees and other plants, tubers, roots and the like, cut flowers and ornamental foliage	56.053	106.815	50.762	7,43%	2,58%	0,32%	0,48%
1	Live animals	7.322	84.612	77.290	31,25%	2,65%	0,04%	0,36%
10	Cereals	349.247	80.879	-268.368	-15,00%	2,99%	0,41%	0,07%
5	Other products of animal origin (hair, bone, horn, ivory, coral, intestine, etc.)	33.747	67.874	34.128	8,07%	5,10%	0,48%	0,61%
13	Lacquer, gum, resin and other vegetable saps and extracts	4.683	18.486	13.803	16,48%	3,95%	0,08%	0,23%
14	Vegetable plaiting materials, herbal products not elsewhere specified or included	23.340	12.163	-11.177	-6,99%	2,51%	2,56%	1,07%

Source: *Calculated based on TURKSTAT data*

(The relevant cells of products with an annual average export growth rate higher than the world average and products with an increasing share in world exports are colored blue. Conversely, the relevant cells of products showing low performance in exports are colored yellow. Products that do not show a significant difference are not colored.)



"Fruit"[5] has the biggest share in Turkey's exports of agri-food products. However, although there was an increase in exports in this item during the 2010-2019 period (2.01% annually on average), it is seen that this increase fell far behind the increase in world exports (5.93% annually) and the opportunities in the world could not be utilized sufficiently. For this reason, its share in world exports sharply decreased from 4.60% in 2010 to 3.28% in 2019.

Likewise, regarding "Vegetable"[6] item, there was a decrease from 1.98% to 1.45% in the share of world exports in the 2010-2019 period. There was a similar decline in the "Various Ready Food Products"[7] class. Although the export performance in "Processed Fruit and Vegetables"[8] products was close to the increase in world exports, it is thought that the potential could not be utilized sufficiently when compared to other successful products.

The main driver of the increase in Turkey's agri-food exports is "cake/biscuits, pasta, bulghur[9] and "Wheat flour"[10], the raw material of which are mostly based on imports. In 2019, Turkey exported 3.3 million tons of"Wheat Flour" (HS CODE 1101) in return for 1.05 billion US Dollars and took first place in world exports with a share of 21%. Approximately 6.5 million tons of wheat were imported in 2019, and processed products (flour, pasta, bulghur, semolina, biscuits) equivalent to 7.9 million tons of wheat were exported. (Export data and world ranking regarding pasta, bulghur, biscuits, and selected products, which have a remarkable share in Turkey's exports are given in Table 13).

A significant increase was also achieved in the export of "Cocoa and cocoa preparations" products, the raw materials of which are based on imports. It is thought that the threat of being dependent on imports in the raw materials of these products is low and it is a market that is open to development, as it is not among the basic food products, its raw material can be produced efficiently by a small number of countries due to its suitability to climate and geography, and therefore there are equal competition conditions in raw material supply with all rival countries.

The growth was also above the world export increase rate in the export of "Animal and vegetable oils"[11] products, where olive oil, sunflower seed oil, and soybean oil have a large share. Although export to Iraq in this class reached 833 million USD in 2012 from 146 million USD in 2010, it decreased to 119 million USD in 2019, being on a continuous decline. Being dependent on foreign sources in soybean and sunflower seeds, the war and economic uncertainties in the neighbors (Iraq, Syria), which constitute the main market, since a market diversity could not be formed, pose a threat to this sector.

The increase in exports of "Fish and Aquaculture"[12], where the share of domestic inputs is higher compared to these products , "Meats and edible meat offal" (poultry meat with a 97% share), "Dairy products, eggs, natural honey, other edible products of animal origin" (mainly eggs and cheese), and "Sugar and sugar products" (mainly confectionaries) has had a significant share in the increase in total exports and has shown a successful performance by achieving growth above the global export growth rates. The exports of “coffee, tea, maté and spice” products, in which spices have the largest share, also displayed a successful performance with a high increase, although they did not have a large share in the increase in exports.

The raw material of the food industry (Grain), which has increased in high rates and amounts in recent years, takes the biggest share in imports and foreign trade deficit (Table 14). It is followed by "Oil seeds and fruits"[13] "Residues and waste of the food industry, roughages prepared for animals" and "Live Animals." It can be seen that the increase in exports of "cereal products" (pasta, wheat flour) and "Vegetable Oils" (Sunflower Oil, Soybean Oil) is provided by the processing of imported products (Table 15, Table 16).

5- "Fruit": Fresh and Dried fruits and nuts - HS Code 08; Edible fruits and nuts
6- Vegetables": Wet, dry and frozen - HS Code 07; Edible vegetables and certain roots and tubers
7- "Various Ready to Eat Food Products": HS Code 21; Various edible food preparations - coffee extracts, tea extracts, yeasts, sauces, diet foods, etc. -
8- "Processed Fruits and Vegetables": HS Code 20; Preparations of vegetables, fruits, nuts, and other parts of plants
9- “Cake/biscuit, pasta, bulgur: HS Code 19: Cereals, flour, starch or milk preparations, pastry products
10- "Wheat flour": HS Code 11: Milling products, malt, starch, inulin, wheat gluten
11- "Animal and vegetable oils": HS Code 15: Animal and vegetable fats and oils, edible fats, animal and vegetable waxes
12- "Fish and aquaculture": HS Code 3: Fish, crustaceans, mollusks and other aquatic invertebrates
13- "Oilseeds and fruits": HS Code 12: Oilseeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage)

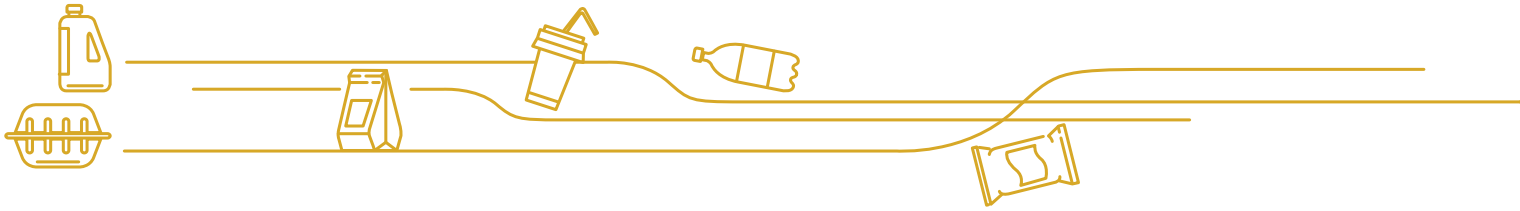
Table 13: *Turkey - Export Volume of Selected Products, Its Share and Ranking in Global Exports*

Name of the product	HS Code	Export - 2019		Shares in the world export	World Ranking
		Quantity (1,000 tons)	Amount (1,000 $)		
Hazelnut - Unshelled	080222	193	1.245.000	67%	1
Wheat flour	1101	3.262	1.051.000	21%	1
Pasta	1902	1.273	607.000	6%	4
Poultry Meat	0207	457	571.400	2,1%	12
Raisins	080620	243	521.600	29%	1
Biscuit - Dessert	190531	188	343.000	4,1%	7
Wafer	190532	132	332.000	7,4%	5
Egg	0407	273	295.000	7,2%	4
Dry fig	080420	85	284.000	50%	1
Dried apricots	081310	100	253.100	72%	1
Bulghur	190430	263	117.000	69%	1
Pistachio - Unshelled	080252	5	83.400	16%	3

Source: *Calculated based on the data in www.trademap.org*

Table 14: *Agri-Food Products Exports of Turkey by Chapter (1,000 USD)*

Chapter No	Chapter name	TR- Import (1000 $)		Amount of Change	Annual Rate of Change		Import Coverage Ratio	
		2010	2019		TR-Import	World Imports	2010	2019
Chapter No	**Chapter name**	**7.682.821**	**12.652.049**	**4.969.228**	**5,70%**	**3,55%**	**157%**	**142%**
10	Cereals	1.056.747	3.219.269	2.162.522	13,18%	2,92%	33%	3%
12	Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage	1.558.753	1.967.228	408.475	2,62%	3,95%	12%	19%
23	Residues and waste from the food industry, roughages prepared for animals	739.080	1.538.952	799.873	8,49%	3,35%	4%	14%
15	Animal and vegetable fats and oils, edible fats , animal and vegetable waxes	990.266	1.128.055	137.789	1,46%	1,60%	46%	77%
1	Live animals	333.080	700.574	367.494	8,61%	2,18%	2%	12%
21	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	375.926	606.417	230.490	5,46%	5,36%	148%	114%
18	Cocoa and cocoa preparations	406.759	576.715	169.955	3,96%	2,91%	106%	113%
24	Tobacco and processed substances as tobacco substitutes	368.274	554.783	186.510	4,66%	3,19%	189%	163%
8	Edible fruits and nuts	315.153	468.719	153.565	4,51%	5,96%	1108%	891%



7	Edible vegetables and certain roots and tubers	315.398	312.743	-2.655	-0,09%	3,47%	351%	334%
9	Coffee, tea, maté and spices	103.376	282.124	178.748	11,80%	3,45%	100%	59%
22	Soft drinks, spirits and vinegar	138.969	262.271	123.302	7,31%	4,13%	165%	131%
3	Fish, crustaceans, mollusks and other aquatic invertebrates	133.830	182.114	48.284	3,48%	4,92%	234%	528%
19	Cereals, flour, starch or dairy preparations, pastry products	169.328	179.046	9.718	0,62%	3,87%	475%	1049%
17	Sugar and sugar confectionery	52.453	170.921	118.469	14,03%	-0,85%	739%	361%
4	Dairy products, eggs, natural honey, other edible products of animal origin	128.277	115.095	-13.182	-1,20%	3,19%	237%	559%
11	Milling products, malt, starch, inulin, wheat gluten	52.782	110.004	57.222	8,50%	2,45%	1365%	1182%
20	Preparations of vegetables, fruit, nuts and other parts of plants	62.915	81.469	18.554	2,91%	3,45%	2370%	2463%
5	Other products of animal origin (hair, bone, horn, ivory, coral, intestine, etc.)	38.273	55.398	17.125	4,19%	4,32%	88%	123%
13	Lacquer, gum, resin and other vegetable saps and extracts	32.122	50.966	18.844	5,26%	4,73%	15%	36%
6	Live trees and other plants, tubers, roots and the like, cut flowers and ornamental foliage	49.757	42.857	-6.900	-1,65%	1,68%	113%	249%
2	Meat and edible meat offal	250.174	28.964	-221.210	-21,30%	3,90%	83%	2024%
14	Vegetable plaiting materials, herbal products not elsewhere specified or included	6.860	9.417	2.557	3,58%	4,92%	340%	129%
16	Preparations of meat, fish, crustaceans, molluscs or other aquatic invertebrates	4.267	7.947	3.680	7,15%	3,47%	1307%	1591%

Source: *Calculated based on TURKSTAT data*

(The relevant cells of the products whose annual average import growth rates are higher than the world import growth rates and the products whose import coverage ratio have decreased are colored yellow. Conversely, the relevant cells of the products whose export/import coverage ratio has increased and whose import rate is lower than the world import rate are colored blue)

Table 15: *Turkey - Agri-Food Items That Have Foreign Trade Surplus by Chapters (1,000 US dollars)*

		TR- Foreign Trade Surplus (1.000 $)		Amount of Change
		2010	2019	
Chapter No	Chapter name	8.037.919	12.355.621	4.317.701
8	Edible fruits and nuts	3.175.726	3.708.344	532.618
20	Preparations of vegetables, fruit, nuts and other parts of plants	1.428.441	1.924.980	496.539
19	Cereals, flour, starch or dairy preparations, pastry products	635.151	1.699.446	1.064.295
11	Milling products, malt, starch, inulin, wheat gluten	667.431	1.190.117	522.686
3	Fish, crustaceans, mollusks and other aquatic invertebrates	179.098	780.119	601.021
7	Edible vegetables and certain roots and tubers	792.085	731.652	-60.433
2	Meat and edible meat offal	-42.162	557.211	599.374
4	Dairy products, eggs, natural honey, other edible products of animal origin	175.189	528.774	353.585
17	Sugar and sugar confectionery	334.968	446.060	111.092
24	Tobacco and processed substances as tobacco substitutes	328.754	351.704	22.950
16	Preparations of meat, fish, crustaceans, molluscs or other aquatic invertebrates	51.506	118.483	66.977
21	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	178.765	86.052	-92.713
22	Soft drinks, spirits and vinegar	90.549	81.049	-9.500
18	Cocoa and cocoa preparations	24.168	72.448	48.280
6	Live trees and other plants, tubers, roots and the like, cut flowers and ornamental foliage	6.296	63.959	57.662
5	Other products of animal origin (hair, bone, horn, ivory, coral, intestine, etc.)	-4.527	12.476	17.003
14	Vegetable plaiting materials, herbal products not elsewhere specified or included	16.480	2.746	-13.734

Source: *TURKSTAT*

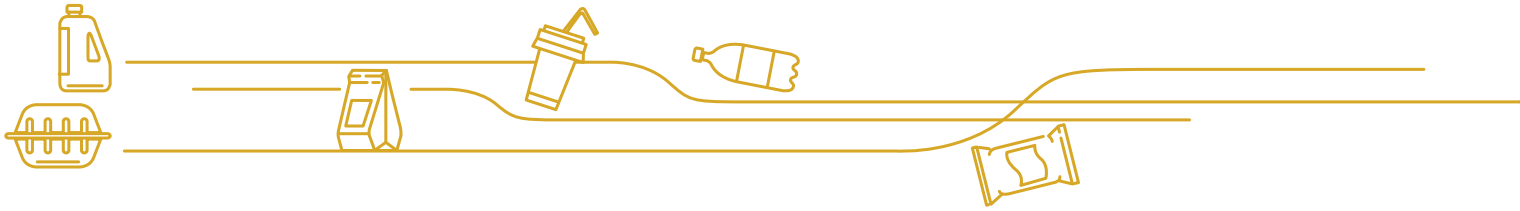


Table 16: *Turkey - Agri-Food Items That Have Foreign Trade Deficit by Chapters (1,000 US dollars)*

		TR- Foreign Trade Deficit (1.000 $)		Amount of Increase in the Deficit
		2010	2019	
Chapter No	Chapter name	-3.680.268	-7.061.205	3.380.938
10	Cereals	-707.500	-3.138.390	2.430.890
12	Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage	-1.375.866	-1.584.180	208.314
23	Residues and waste from the food industry, roughages prepared for animals	-711.744	-1.319.463	607.719
1	Live animals	-325.758	-615.962	290.204
15	Animal and vegetable fats and oils, edible fats , animal and vegetable waxes	-532.031	-256.191	-275.840
9	Coffee, tea, maté and spices	70	-114.540	114.610
13	Lacquer, gum, resin and other vegetable saps and extracts	-27.439	-32.480	5.041

Source: *Calculated based on TURKSTAT data*

Except for "Fruit", "Vegetables" and "Various Ready-to-Eat Products", a successful performance was delivered in the export of products with relatively higher domestic inputs. The low performance in "Fruit" and "Vegetable" products, which have a large share in exports could only be compensated by the increase in exports of products whose raw materials are mostly based on imports.

It is understood that as in the "poultry" and "egg" sectors, in order to ensure sustainability in "Fruit", "Vegetable" and "Various Ready-to-Eat Products" sectors, to increase their competitiveness and to evaluate their potential in the world markets, sector-specific measures need to be taken, and detailed analyses and national strategic plan of the sectors need to be prepared. At the same time, it is necessary to increase the domestic raw material production in products whose production and/or export is based on imports (wheat flour, pasta, vegetable oil, animal feed), and the raw material supply risk should be taken into account in industrial investment and incentive policies.

Foreign Trade - Country Analysis

Considering the import data, it is seen that agricultural products (cereals, oilseeds), which cannot be fully supplied domestically, are mainly supplied from Russia, Brazil, Ukraine, the USA, and Malaysia, which are leaders in these products with a high level of production and competitive prices.

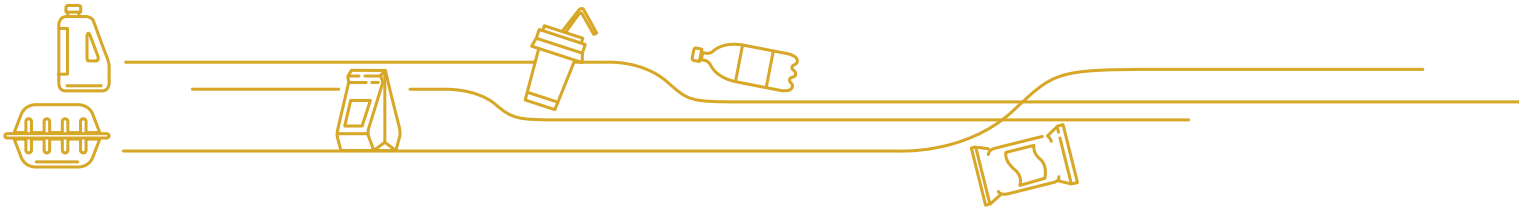
Iraq is the largest market for export products. Iraq has the largest share with 60% and 49% respectivelyin "Wheat Flour" and Cake/biscuit, pasta, and bulghur," which have a significant place in Turkey's exports. Although there was an 8% increase in US dollars between 2010 and 2018, the extremely volatile course of sales to Iraq makes it difficult for exporters to plan (Table 7). A remarkable success was achieved in sales to the USA, one of the largest markets for exports, with an annual average growth of 10.1%. On the other hand, while China did not have a great share in Turkey's exports, whereas the export made to this country was 30 million USD in 2010, it increased remarkably in 2018 by reaching up to 130 million USD. However, according to World Bank data, the Chinese market, which imported 123 billion USD of agri-food products in 2018, has the potential to offer greater opportunities.

Table 17: *Turkey's Agri-Food Products Import and Export by Country (1,000 US dollars)*

Turkey _Agriculture-Food Products Import (1000 $)					
		2010	2018	Amount of Change (2010-2018)	Average Annual Rate of Change
	World	**7.407.569**	**12.499.242**		
1	Russia	580.073	2.069.989	1.489.917	17,2%
2	Brazil	245.636	1.449.774	1.204.138	24,8%
3	Ukraine	589.360	817.996	228.637	4,2%
4	USA	1.132.296	768.850	-363.446	-4,7%
5	Malaysia	319.985	617.639	297.654	8,6%
6	Uruguay	155.480	421.407	265.927	13,3%
7	Germany	340.827	404.812	63.985	2,2%
8	Netherlands	227.366	354.109	126.742	5,7%
9	Poland	202.297	278.010	75.713	4,1%
10	Argentina	194.394	275.327	80.933	4,4%
11	Romania	118.575	275.274	156.699	11,1%
12	Bulgaria	225.618	245.340	19.722	1,1%
13	China	98.086	214.547	116.461	10,3%
14	Italy	133.316	200.442	67.125	5,2%
15	France	128.372	184.862	56.489	4,7%

Turkey _Agriculture-Food Products Export (1000 $)					
		2010	2018	Amount of Change (2010-2018)	Average Annual Rate of Change
	World	**11.825.855**	**17.318.735**		
1	Iraq	1.545.121	2.849.920	1.304.799	8,0%
2	Germany	1.148.687	1.323.222	174.535	1,8%
3	USA	409.817	905.730	495.913	10,4%
4	Russia	985.744	884.804	-100.940	-1,3%
5	Italy	536.108	680.398	144.290	3,0%
6	Syria	236.557	644.777	408.221	13,4%
7	Saudi Arabia	380.378	549.151	168.774	4,7%
8	Netherlands	373.985	541.252	167.267	4,7%
9	England	347.200	516.635	169.435	5,1%
10	France	438.411	341.020	-97.392	-3,1%
11	Israel	186.792	318.512	131.720	6,9%
12	Libya	94.973	307.018	212.046	15,8%
13	Romania	206.371	274.795	68.424	3,6%
14	UAE	110.607	256.198	145.591	11,1%
15	Belgium	270.282	237.360	-32.922	-1,6%

Source: *World Bank (https://wits.worldbank.org/)*



It can be observed in TURKSTAT foreign trade statistics that the Russian market follows a fluctuating course similar to Iraq and creates uncertainties for companies.

Regarding the export to Germany, although Germany's imports increased by 45% in "Fruit," which has the highest share in export, the rate of increase in Turkey's exports to Germany regarding this item remained at 11%. Spain, the USA, the Netherlands, South Africa, Peru, and Morocco were among the countries that showed the highest increase in exports to Germany (For example, while there were high increases in Germany's imports of strawberries, blueberries, kiwi, persimmon products under the HS CODE of 0810, Turkey could not receive a share of these products' market). A similar trend is observed in the "Processed fruit and vegetable" class.

Sales to Italy were in line with the overall agri-food import trend of Italy, however, the sales made to Italy in "fish and aquaculture" products increased from 42 million USD to 111 million USD in 2010-2018 period and significant success was achieved.

Likewise, although the total imports of France increased significantly (32%) in "Fruit" products like Germany, Turkey's increase of exports to France in this item remained limited to 3.5%. Increases in imports of France in this product were met by Spain, Italy, Morocco, Ivory Coast, and Colombia. The purchases of France in the "processed fruits and vegetables" class have increased by about 15%, but the increase in Turkey's exports to these countries remained at 6%. France has increased its purchases for this product in favor of countries in the nearby geography (Belgium, Netherlands, Spain, Germany, Italy).

The impression created is that Turkey has started to lose its competitive advantage in "Fruit" and "Processed fruits and vegetables" products, which have the largest share in its exports, especially against EU countries.

Conversely, in the "Fish and seafood" class, it is seen that Turkey embraced a competitive position and increased its sales.

3.3. The General View of the Food Sector in the TR21 Region

Thrace Region, which keeps the TR21 Region within, is located in an important transition zone between Europe, Asia, the Middle East, and the Former Eastern Bloc. Global transit routes and significant investments increase the importance of the region on a global scale. In the Eurasia region, Istanbul, which is a regional center, and the Thrace Region, which is in interaction with it, is an important transition corridor as well as one of the main development centers of the geography. It forms the border of the country with Europe. Thrace Region has wide and fertile agricultural areas. It is one of the important agricultural production centers of the country with its experience. In Thrace, where agricultural mechanization is high, yield rates are also above the country average. Sunflower, wheat, rice and canola are widely produced in the region. However, the region produces below its potential in fruits and vegetables (TRAKYAKA, 2014).

According to 2019 data, 14,848 insured were employed in 1.420 workplaces in the Food Products Manufacturing sector in the TR21 Region, which encompasses Tekirdağ, Edirne, and Kırklareli. Although the average firm size regarding the number of employees is close to micro-scale, it is in the small-scale class. It is also parallel to Turkey's average in terms of the number of employees per enterprise. It is situated at an average level in the Food Products Manufacturing sector in terms of the number of insured employees with a 3.2% share in Turkey (Table 18).

Although Food Products Manufacturing constitutes the largest sector in the manufacturing industry according to the number of workplaces, it ranks third with a share of 7.7% after "Textile Products Manufacturing" and "Clothing Manufacturing" according to the number of insured employees (Table 19).

Table 18: *Number of Workplaces and Employees in TR21 Region*

	Number of Workplaces	Number of Insured Employees	Number of employees per workplace
TR21 - Food Products Manufacturing	1.420	14.848	10,5
Turkey - Food Products Manufacturing	45.097	466.144	10,3
TR21 - Manufacturing Industry	5.695	192.091	33,7
TR21 - All Sectors	42.205	397.631	9,4
TR21 - Food Products Manufacturing			
Share in Turkey	3,1%	3,2%	
TR21 - Share in Manufacturing Industry	24,9%	7,7%	
TR21 - Share in All Sectors	3,4%	3,7%	

Source: Calculated based on SSI data (SSI, 2019)

Table 19: *Number of Workplaces and Employees by Sectors in TR21 Region*

Chapter	Chapter Name	TR21 Region	
		Number of Workplaces	Number of Insured Employees
10	Food Products Manufacturing	24,9%	7,7%
25	Fabrication of Metal Products (except machinery and equipment)	11,9%	6,2%
33	Machinery And Equipment Installation and Repair	9,1%	1,4%
13	Manufacture of Textile Products	8,2%	28,0%
23	Man. of Non-Metallic Products	5,8%	4,2%
22	Man. of Rubber and Plastic Products	5,5%	5,8%
14	Clothing Manufacturing	5,3%	16,1%
16	Wood, Wood Products and Mushroom Produc.	5,0%	1,2%
28	Machinery and Equipment Manufacturing	4,6%	2,4%
31	Furniture manufacturing	3,2%	0,7%

Source: Calculated based on SSI data (SSI, 2019)

Firms engaged in agriculture-based industrial production in Edirne have intensified their investments in paddy, oil, milk and dairy products sectors. Kırklareli is a major producer in agricultural production, foremost being oil seeds, and animal breeding. The agriculture-based industry, which includes dairy products, vegetable oil plants, meat processing plants, and flour manufacturing, has developed in the province. In Tekirdağ, oil and fat manufacturing and milk and dairy products sectors stand out in food (TRAKYAKA, 2021a, b, c).

Foreign Trade

TR21 Region is a net importing region. In 2019, whereas the amount of export was 283 million US dollars, the amount of import was 334 million dollars. Between 2010 and 2019, the average annual rate of increase in exports (11.1%) was higher than the average annual increase in imports (4.0%), so that the foreign trade deficit was 125 million USD in 2010 and decreased to 51 million USD in 2019 (Table 20).

Table 20 : *TR21 Region Agri-Food Products Total Import-Export*

(Chapter No: 1-24)	(1000 $)		Amount of Change	Annual Rate of Change	Import Coverage Ratio		Share in Turkey	
	2010	2019	(2010-2019)		2010	2019	2010	2019
Total Exports	109.639	282.645	173.006	11,1%	47%	85%	0,9%	1,6%
Total Imports	234.226	333.510	99.285	4,0%			3,0%	2,6%
Net Foreign Trade Balance	-124.586	-50.865	73.721	-9,5%				

Source: *Calculated based on TURKSTAT data*

According to the data of 2019, in the TR61 region, the "Milling products, malt, starch, inulin, wheat gluten" class, which includes the product "Flour" has the largest share in exports in agro-food products with 167 Million USD. This is followed by “Various edible food preparations”, with an annual average growth of 44.86% between 2010 and 2019, regarding which USD 49 Million was exported. In the same period, remarkable growth was achieved in the exports of "Sugar and sugar products".

With a significant acceleration in "Dairy products, eggs, natural honey, other edible products of animal origin", which were not exported in 2010, exports of 8.1 million US dollars were reached in 2019. A similar trend has been experienced in the product "Fish, crustaceans, mollusks and other aquatic invertebrates" and the export of this product increased from 481 thousand USD to 4.5 million USD in the same period. In contrast to these increases, exports of 20 million USD in 2010 in the category of "Edible vegetables and some roots and tubers" declined sharply to 7 million USD in 2019 (Table 21).

Table 21 : *Export according to TR21 Region Agri-Food Products HS Codes*

		Export (1.000 $) TR 21 Region Tekirdağ, Edirne, Kırklareli		Share in Turkey		2010-2019	
Chapter	Chapter name	2010	2019	2010	2019	Amount of Increase	Annual Increase Rate
11	Milling products, malt, starch, inulin, wheat gluten	41.637	167.007	5,78%	12,85%	125.371	16,69%
21	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	1.730	48.606	0,31%	7,02%	46.876	44,86%
17	Sugar and sugar confectionery	15.404	23.578	3,98%	3,82%	8.174	4,84%
19	Cereals, flour, starch or dairy preparations, pastry products	7.310	9.565	0,91%	0,51%	2.255	3,03%
4	Dairy products, eggs, natural honey, other edible products of animal origin	0	8.146	0,00%	1,27%	8.146	
7	Edible vegetables and certain roots and tubers	20.019	6.976	1,81%	0,67%	-13.043	-11,05%
3	Fish, crustaceans, mollusks and other aquatic invertebrates	481	4.481	0,15%	0,47%	4.000	28,14%
20	Preparations of vegetables, fruit, nuts and other parts of plants	1.766	2.319	0,12%	0,12%	554	3,08%
2	Meat and edible meat offal	0	2.069	0,00%	0,35%	2.069	
18	Cocoa and cocoa preparations	12.637	1.953	2,93%	0,30%	-10.684	-18,74%

Source: *TURKSTAT*

“Cereals” had the biggest share in imports with 233 million US Dollars. Parallel to the increase in exports of "milling products, malt, starch, inulin, wheat gluten", "Grain" imports grew by an average of 18% per year in the 2010-2019 period. "Oilseeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage" and "Animal and vegetable fats and oils, edible fats, animal and vegetable waxes" have the biggest share in import after "Grain", with 57 million US dollars and 9.4 million USD respectively. However, there was a great decrease in the import of these products in the 2010-2019 period (Table 22).

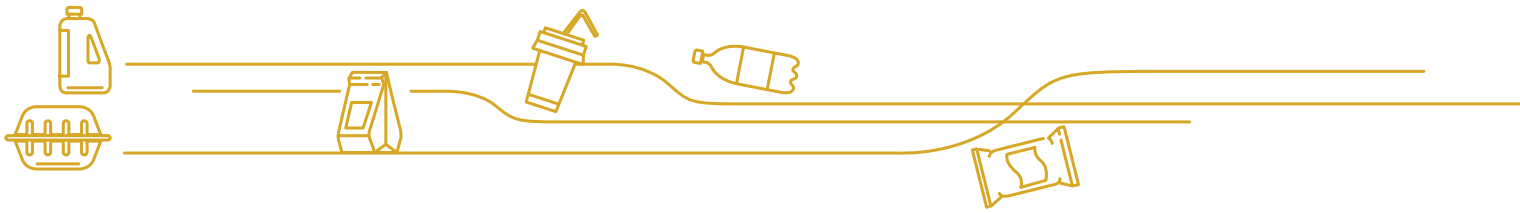


Table 22 : *Import according to TR61 Region Agri-Food Products HS Codes*

		Import (1.000 $) TR 21 Region Tekirdağ, Edirne, Kırklareli		Share in Turkey		2010-2019	
Chap-ter	**Chapter name**	**2010**	**2019**	**2010**	**2019**	**Amount of In-crease**	**Annual Increase Rate**
10	Cereals	52.571	232.863	4,97%	7,23%	180.293	18,0%
12	Oil seeds and fruits, various grains, seeds and fruits, plants used in industry and medicine, straw and roughage	89.949	56.949	5,77%	2,89%	-33.001	-5,0%
15	Animal and vegetable fats and oils, edible fats , animal and vegetable waxes	72.042	9.395	7,28%	0,83%	-62.647	-20,3%
23	Residues and waste from the food industry, roughages prepared for animals	8.912	7.764	1,21%	0,50%	-1.148	-1,5%
4	Dairy products, eggs, natural honey, other edible products of animal origin	61	5.651	0,05%	4,91%	5.589	65,4%
1	Live animals	8.009	5.362	2,40%	0,77%	-2.647	-4,4%
17	Sugar and sugar confectionery	55	5.080	0,10%	2,97%	5.025	65,5%
11	Milling products, malt, starch, inulin, wheat gluten	824	2.809	1,56%	2,55%	1.985	14,6%
19	Cereals, flour, starch or dairy preparations, pastry products	621	1.834	0,37%	1,02%	1.213	12,8%
6	Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)	15	1.798	0,00%	0,30%	1.783	69,8%

Source: *TURKSTAT*

4. Effects of the COVID-19 Pandemic on the Food Industry

The COVID-19 pandemic is putting unprecedented pressure on global agriculture and food supply chains. As a result, it has led to bottlenecks in input industries, agricultural production, food processing, shipping, and logistics, as well as major shifts in demand for food and food services (OECD - FAO, 2020).

Due to the measures taken, food consumption has decreased especially in restaurants, diners, cafes, and similar places. Firstly, this situation has reduced the total demand for food in the first place. Therefore, it is not possible for products that cannot be exported to be consumed domestically in the short term. This created the risk of extra storage costs for storable products and food waste and squander for perishable products (KKB, 2020).

The pandemic has been found to have an impact on "food production" and "general food demand", but its devastating effect has been mainly observed more in the complex network of actors, from farm to table. Oversupply or shortage of different food products were also observed. For example, it has created both surpluses for producers and shortages for consumers in meat processing. Empty shelves were created in supermarkets, especially in the early days of COVID-19. However, the risk to food security for 2021 is largely due to disruptions in supply chains. COVID-19 is predicted to cause a serious increase in poverty and hunger, especially in developing countries where social safety nets are less developed. It is also foreseen that if rapid action is not taken by the World Food Program (WFP, 2020), the number of people suffering from acute food insecurity could double in 2020 to 265 million, and even in developed countries, more vulnerable groups such as the elderly, chronically ill and poor households may still be at risk. However, it should be borne in mind that COVID-19 reveals preexisting gaps in social protection systems (OECD, 2020a). Nevertheless, at the point reached in 2021, it seems that the product stocking insecurity has disappeared, the shelves are filled, and the long lines at the borders have shrunk. Delivering food to where it is needed reminds the importance of the international trade environment and emphasizes the importance of safety nets.

4.1. Comparison of Before and After the Pandemic

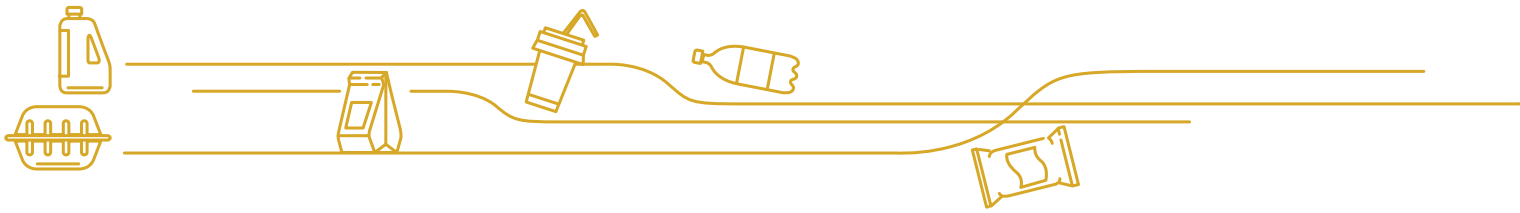
World

The COVID-19 pandemic has impacted all links of food supply chains, simultaneously affecting agricultural production, food processing, shipping and logistics, and final demand. Naturally, not all sectors and products are equally affected, but each product has been found to be disrupted at different stages of the supply chain:

a. Production in the field faced bottlenecks in terms of some inputs, and limitations on the mobility of the workforce have negatively affected the availability of seasonal workers for planting and harvesting in the fruit and vegetable sector in many countries. Cereals and oilseeds typically require less labor, while fruits and vegetables require more human labor and are more dependent on the seasonal workforce than others, causing bottlenecks in terms of some inputs, foremost being labor.

b. Food processing has been interrupted by labor shortages and shutdowns. COVID-19 has created disruptions in food processing industries due to rules regarding social distancing, labor shortages stemming from the disease, and measures taken to contain the spread of the virus. In closed areas such as fruit and vegetable packaging facilities or meat processing facilities, necessary social distancing measures have reduced the efficiency of operations; moreover, many firms report high rates of worker absenteeism. For example, staff availability in meat processing facilities in the regions of France most affected by COVID-19 has decreased by up to 30% (OECD, 2020a).

c. In general, agricultural and food products are transported using three main transport methods (FAO, 2020c). Different products are transported by different transport methods such as ships and large boats (in bulk), containers and trucks, and air transport. For example, cereals and oilseeds



are typically shipped in bulk, while meat and dairy products are usually transported in refrigerated containers and trucks, and high-value products and perishable products are transported by air in the 'bellies' of passenger aircraft. Some modes of transport have been affected more than others by the pandemic; transport and logistics bottlenecks have disrupted the movement of products along supply chains. The impact of COVID-19 on these modes of transport has varied significantly. Although mass transportation prices in collective delivery were observed to be at the lowest levels of the last few years, air transport was severely disrupted. Global air cargo capacity was 26% lower in the week of May 10-16 compared to the same period last year. This decline of more than 80% was the largest on routes between Europe and Latin America, with the cut caused by the sudden drop in air travel, which accounts for most of the air cargo capacity. Even if less often, the disruptions in container and truck transportation have also created problems, although less often. Due to COVID-19 restrictions such as restrictions on crew replacement, health screenings, forced quarantines, and reduced demand, the number of container ships has dropped 8% below normal (Amis, 2021). Commercial road transport in April was approximately 20% lower than the normal figures for Canada and the USA (Geotab, 2021). Truck traffic in Europe was at least 50% lower in Spain, 46% lower in France, and 37% lower in Italy than in the pre-crisis period. In mid-April, the total distance traveled by trucks in Europe was 24% below the average of previous years (Sixfold, 2021). Therefore, transport and logistics problems were most prominent for perishable high-value products such as fruit and vegetables. The fruit and vegetable sector has been affected by quarantine measures and delays in border inspections, including a decrease in the number of import and export inspectors. In contrast, grain supply did not encounter major disruptions; public transport was less affected and grains could be loaded, shipped, and used with minimal labor input.

d. There have been rapid and unprecedented changes in consumer demand. COVID-19 has led to a dramatic shift in consumer demand, from restaurants, catering, and other "food-away-from-home" types to food consumed at home, causing significant changes in the food supply chains operations. As the COVID-19 pandemic accelerated, selling food away from home has come to a standstill in hotels, restaurants, dining halls, and cafes. Restaurant reservations decreased sharply in early March 2020, almost to zero as lockdowns were implemented (Opentable, 2021).

e. At the same time, retail food demand has increased. Frozen and packaged food sales in particular increased dramatically. While the weekly frozen food sales in France increased by 63% compared to the previous year, packaged food sales also increased by 56% compared to the previous year. Similar increases in demand have been observed in other countries as well. After this first spike in March, the increase in retail demand for fresh, frozen, or packaged food has stabilized at around 15-20% compared to a year ago (BCG, 2020).

This change in demand has a great impact on the food value chain. In the US, for example, "food away from home" sector normally constitutes 10% of fruit consumption, 32% of vegetables, 25% of dairy products, 31% of cereals, and 33% of protein food (the category, which includes meat, seafood, and eggs among other things) (USDA, 2021). In most countries, the industry accounts for at least 25% to 30% of total sales of fresh fruit and vegetables (OECD, 2020b). It is not easy to shift these volumes to the retail sector. In addition to logistical difficulties, household consumption habits at home differ from those outside the home. For example, out of home foods include using more cheese than consumers use at home (e.g., as a sauce on pizza) and also more expensive meat cuts (e.g. steak vs. minced meat at home). Even where similar products are consumed, products that are normally sold to restaurants and food-service operations cannot always be sold without extra cost to the retail consumer. For example, while the food-service industry purchases large cheese blocks, much smaller packages are needed for retail sales. Retailers may have different quality expectations or other extra requirements. Finally, hotels and restaurants can make significant contributions to food banks, and their closure has reduced supply to these outlets at a time of rising demand for food banks' services (OECD, 2020c).

As a result:

Given the major global impacts of COVID-19, "food and beverage companies" faced declining consumption and distortions in the supply chain. Home consumption has increased rapidly, and out-of-home consumption has come to a standstill. This situation negatively and rapidly affected

the profitability of companies. Many companies tried to reduce the damage by directing their products to retail stores, agricultural products were suppressed by rapidly changing customer behaviors and demands, and the supply chain was disrupted.

Firms had to re-evaluate their sourcing strategies, product diversity, supply chain, and market access channels. The need to improve and modernize e-commerce and distribution networks has arisen. Depending on the effects of raw material prices and distribution costs, companies had to reschedule their price and promotion strategies, along with the methods of increasing demand (Deloitte, 2020). Many countries are taking different risk reduction and adaptation measures for the agriculture and food sectors in response to the pandemic. When the measures taken are grouped, it has been observed that the continuity of the agriculture and food distribution chain, financial sustainability of the agricultural value chain, agricultural work, encouraging local food, digitalization in agriculture, and data sharing stand out (KKB, 2020).

Turkey

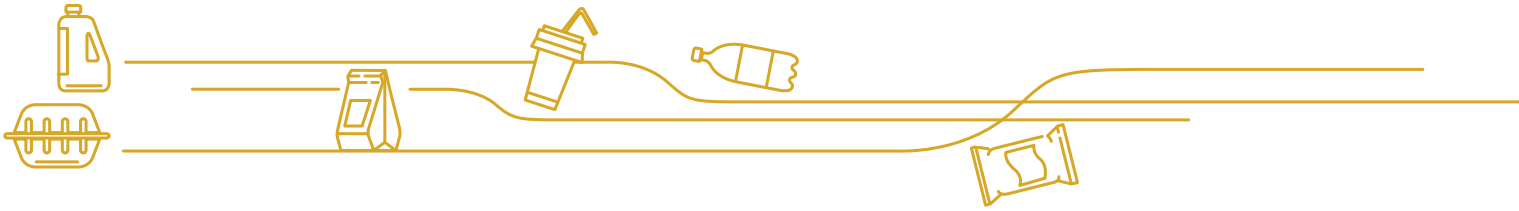
Important considerations in the evaluation process of the pandemic concerning Turkey are associated with the sector's position regarding internal and external supply as well as its resources. One of the strongest aspects of Turkish agriculture that can contribute to internal supply adequacy is the relatively low dependence on external labor for many products and family farming, which are considered weakness for some other issues. In addition, throughout the process, the speed and level of adaptation of the urban population to the supply of products via the internet, as well as the retail chains, is one of the strong features that will protect the competence of the domestic market. However, the small producer structure, which has a less negative impact on the sustainability of production, cannot easily adapt to this system change, and producers have difficulties in accessing both the domestic market and the inputs obtained through imports (Ceylan & Özkan, 2020).

That the food sector in Turkey was affected by the pandemic was partially seen in the crystallizing of the existing problems. The risk of not being able to cultivate basic agricultural products due to foreign dependency in agricultural inputs such as fertilizers, vaccines, etc. is such a situation. A second example can be given as fish feed producers' cutting their production due to closing borders. On the other hand, that a cereal producer country such as Russia cut exports due to food security did not pose a problem since the wheat produced by Turkey was sufficient for domestic consumption. Moreover, thanks to sufficient stock, no problems were experienced in products such as the wheat that Turkey imported from Russia and products such as flour and pasta, produced in Turkey and exported, but the risk posed by this situation was recognized. In agriculture, it was difficult to obtain labor force during harvest due to travel obstacles and the fear of infection risk due to employee contact, wages have increased, but the need for unqualified labor has been met by immigrants (such as Syrian, Afghan). When the borders were closed, exports first stopped, and then started; in this period, exporters had difficulties, and the products were tried to be evaluated domestically. Changes in consumer behavior have also been observed, sales of storable products (flour, pasta, canned products) have increased due to panic, there was also an increase in demand for foods considered to be healthy and immune-enhancing (nutritional supplements, dairy products, fish and aquaculture in domestic consumption, etc.) In the past, packaged products were not preferred, but the sales of packaged products increased because they were safer. Although it did not compensate for their sales losses, many firms started to make sales via e-commerce and the home delivery sales model has also increased in the food sector. On the other hand, out-of-home food consumption has come to a standstill. This situation negatively affected employees in food sales outside the home, and they even lost their jobs. These negativities were followed by increases in food prices. Despite all these negativities observed, it was found that the main problem was not the production but the distribution of the product to the needy.

The aforementioned results are shared in more detail below;

a. Supply / Logistics

In the period when the pandemic started, problems such as prolongation or inability to supply imported inputs such as pesticides, oilseeds, feed raw materials, vaccines, disrupted production. Imports were facilitated by reducing customs duties for products (cereals, sunflower seeds) that



are predicted to pose problems in supply. That the countries restricted the export of agricultural products and increased taxes in order to ensure their own food security created supply risk and cost increase, especially in cereal products. At the same time, the fact that countries increased their commodity stocks in order to ensure food security caused an increase in prices. In the initial period of the pandemic, the curfew and the late announcement of holidays led to difficulties in production and shipment planning. This problem was solved with the early announcement of the curfews in the following periods. The decision of large food wholesalers and retailers to increase their safety stock limits due to the perception of supply risk caused by the pandemic led to 1-2 months of extra storage.

b. Production

The measures taken by the producers (personal protective equipment, etc.) due to the pandemic, the hygiene demands of the consumers, the disruptions in the sales process have increased costs, and this has also been reflected in the prices. Problems in supply (feed raw materials, vaccines, etc.) due to the closure of borders and quarantine in fish and aquaculture have hampered the production. It has been observed that the overall demand for fisheries has decreased due to restaurant closures, and some fish feed manufacturers have reduced production. In the flour, pasta, pulse, and vegetable oil sectors, retail sales have increased due to stocking behavior aimed at domestic consumption with the panic atmosphere. However, it was not possible for flour and yeast companies to take advantage of the opportunities in domestic consumption due to insufficient packaging capacities for retail consumption. Meat and dairy producers had to buy back their products due to the closure of hotels and restaurants. Although meat and milk producers turned to sales in the retail market for home consumption, the loss could not be compensated and significant losses were experienced in these sectors. Due to the increase in the demand for packaged products, there has been a recovery in the packaging sector and an increase in the sales of small businesses and especially women's cooperatives due to the increase in demand for local products. In the industry, especially in greenhouse cultivation, there has been an increase in the demand for products aimed at automation.

c. Human Resources

With the special permission granted to agricultural producers and enterprises, employees were prevented from staying away from production during curfews. In agriculture, it was difficult to obtain labor force during harvest due to travel obstacles and the fear of infection risk due to employee contact, wages have increased, but the need for unqualified labor has been met by immigrants (such as Syrian, Afghan). Social assistance support recipients may choose not to work. The young population tends not to work in agricultural production due to the low social status perception in the society regarding agricultural activities and young people's perception that the wages in the sector are low. This situation restricts the workforce resource. The pandemic has led to an increase in labor supply problems, which were previously experienced in agriculture. This problem is tried to be overcome by the employment of migrant workers. Firms, whose sales have dropped, have opted for a reduction in personnel, with female employees being the majority. The social crisis was tried to be prevented by providing public support with short-term work allowance to the personnel who had to take a temporary break from work or work part-time. Employment in this field has increased due to the increase in e-commerce.

d. Sales/Marketing

The pandemic has reduced global food demand in the first phase, as out-of-home food consumption is almost over and global food trade is disrupted. However, countries have felt and experienced a "food panic" in their domestic markets due to weakened product stocks, logistics and transportation problems, and restrictions in human movements (especially agricultural workers) before the summer season. In the first period of the pandemic, problems such as the consumption of stocks in the markets were experienced due to panic-induced domestic stocking. However, this problem was not repeated afterwards.

There has been no decline in brands that have invested in the loyal consumer size over the years. Instead of trying new products, the consumer turned to familiar products (TGDF, 2020). There

have been changes in consumer preferences. Healthy, packaged products with a long shelf life have become more preferred. Therefore, the demand for domestic consumption of dairy products, products containing probiotics, canned food, organic products, and seafood has increased. Due to hygiene reasons, sales decreased in the first period of the pandemic in fresh fruits and vegetables, but after the panic passed, these products were evaluated as healthy, and there was an increase in sales. There has been a shift to the retail chain in sales channels, consumers preferred local food and local vendors (butchers, greengrocers, grocery stores, home delivery, and street vendors) during the pandemic. There has been a decrease in the sales of the wholesalers and the consumers have moved away from the neighborhood bazaars. E-commerce has increased during this period. Due to the quarantine, hotels, companies selling food products to hotels, catering companies, restaurants, and cafes have been the sectors most adversely affected in the food value chain in this process. It has been observed that the demand for fish and seafood has decreased due to the closure of the restaurants. At the same time, exports of fish and aquaculture have decreased, and campaigns have been organized to increase domestic demand. Those who were deprived of the opportunity to eat at the university were adversely affected. The severity of the difficulties in low-income families' access to food has increased over the course of the pandemic. Long-term waits at customs due to the closure of borders or quarantine caused export-oriented companies to have difficulty in selling. Export facilitation was provided 1-2 months after the start. The prices of many products increased in parallel with the increase in foreign currency. Russia's reduction of its tomato and pepper purchases led to a decrease in domestic prices. Since the markets in Russia have closed, sales have started to be made to the markets in Russia.

e. Finance

Payments were delayed due to the curfew. In the pandemic, hotels, catering establishments, and restaurants, whose sales decreased significantly, experienced a collection problem and consequently a cash problem. The same problem was observed in companies making sales to factories with decreased production. Public support was provided for the cash problems of the enterprises by deferring tax, insurance premium payments, and providing the companies with loans with credit guarantee fund-backed and non-payment periods. Due to the insufficient cash capital of the farmer, there are uncertainties regarding the production of the next year. Producers' debts and capital shortages remain the challenging conditions for production. Even if the demand increases, there are profitability and cash problems. The pandemic has increased the severity of these problems that have been experienced before. During the pandemic, banks provide all technological branchless banking services and alternative channels (call center, e-branch, mobile banking, ATM) to the service of their customers without interruption. In addition, some banks have started to share financial and agricultural consultancy services, field monitoring, fertilizer advice, current climate information, and product prices via mobile applications (KKB, (2020).

Survey Results

In the nationwide survey, the effects of COVID-19 were also asked. The participating companies were asked to prioritize the problems they experienced during the COVID-19 outbreak in the range of 1-6 (1: high priority, 6: low priority). It was observed that the main problems of the participating companies both throughout Turkey and in TR21 Region were related to the decrease in sales and production volumes. Difficulties in obtaining and the increase in inventory cost took the last place in this ranking (Figure 12).

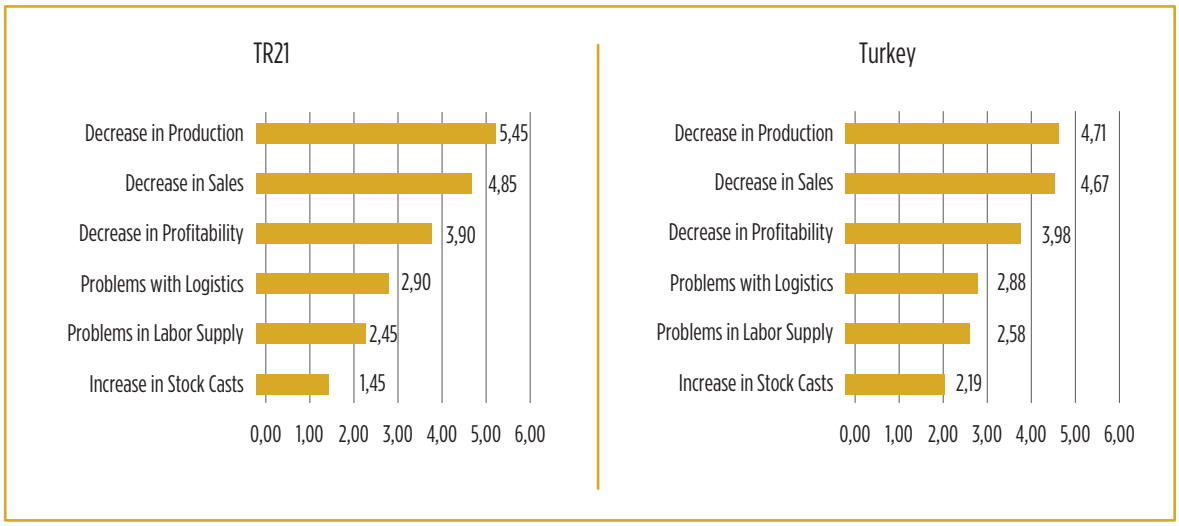


Figure 12: *Problems Experienced in the COVID-19 Outbreak*

One of the negative effects of COVID-19 has emerged as an increase in logistics costs. 50% of the companies that participated in the survey in TR21 Region maintained that logistics costs increased, 28% of them stated that the costs remained the same and 22% stated that they decreased. When asked about the negative consequences experienced throughout the raw material procurement process, 61% of the companies stated that raw material prices increased.

Across Turkey, 69% of the companies that participated in the survey stated that logistics costs increased, 20% stated that they remained the same and 11% stated that they decreased. When asked about the negative consequences experienced throughout the raw material procurement process, the increase in raw material prices with 43%, the lengthening of raw material procurement periods with 21% and the decrease in the predictability of the raw material procurement processes with 18% took the first places.

When companies are asked about the change in turnover, it is seen that the decrease in sales between 2019-2020 is not valid for every product or company. It is noteworthy that the sales of the majority of the respondents (56%) decreased, but sales did not change in 19% and increased in 25% of them. This situation is also valid for export. 56% of the companies participating in the survey stated that their exports decreased, 13% that it remained the same, and 31% stated that their sales increased (Figure 13).

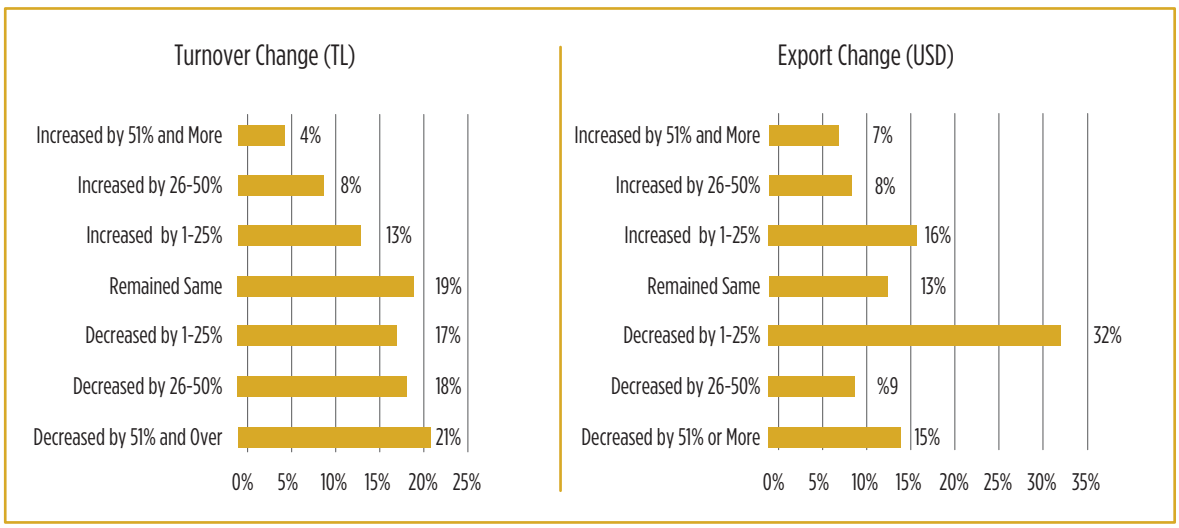


Figure 13: *Problems Experienced in the COVID-19 Outbreak*

When the turnover changes by sub-sectors are analyzed among those who answered the questions in Turkey, all four companies in the vegetable oil sector that participated in the survey are found to have stated that there was no change in sales. The majority stated that the sales of meat, dairy and fish products decreased. The same is true for the bakery and flour products industry. In the processing of vegetables and fruits, it is observed that sales increased in 43% of the respondents and there was no change in 14% (Figure 14).

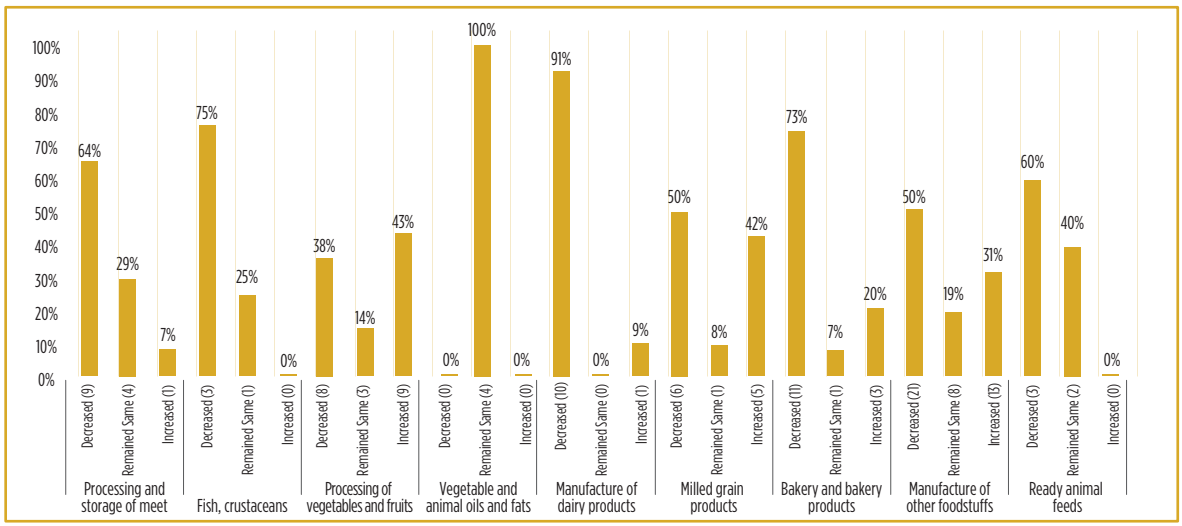


Figure 14: *Turnover (TL) and Export (USD) Change of Firms 2019-2020- Turkey*

According to the results of the survey across Turkey, demand fluctuations caused by COVID-19, key workforce loss, and temporary factory closures have been behind the threats of exchange rate fluctuations and lack of financing as factors that negatively affect the sustainability of companies (Figure 15).

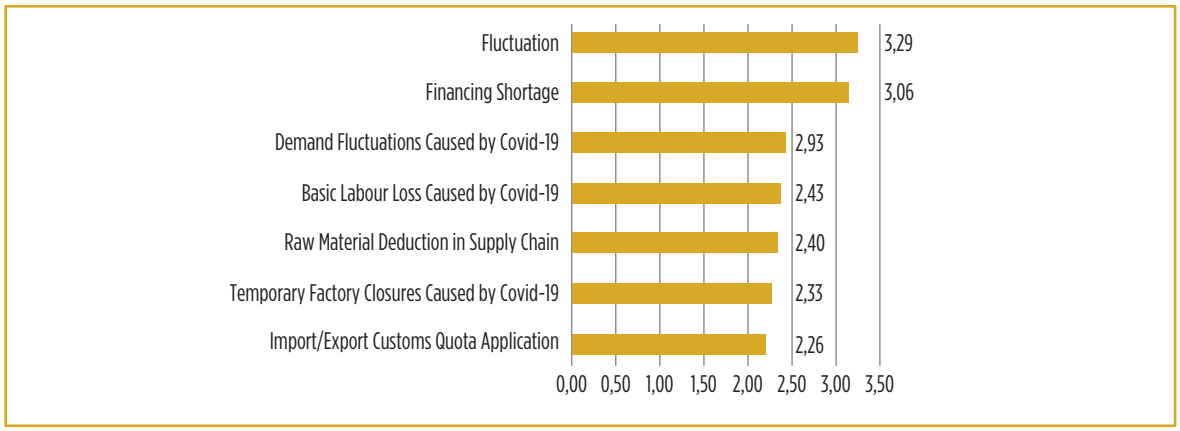
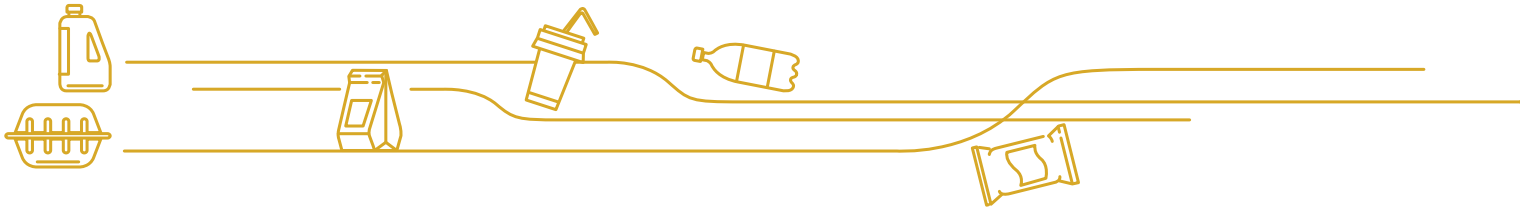


Figure 15: *Factors That Negatively Affect the Sustainability of Companies*



4.2. Possible Changes in the Post-Pandemic Sector

a. Supply / Logistics

It is envisaged that countries will complicate and limit their food exports in order to ensure their own food security. Therefore, stocks and food prices are expected to increase. Some producer countries, from which Turkey also buys agricultural products, choose to cut down on their exports. On the one hand, this situation raises the risk of speculation in these products; on the other hand, it increases the importance of "domestic production" and highlights the importance of international dialogue and cooperation.

Since the need for diversification of raw material channels, supply routes, buyers, distributor networks, efficient management of stocks, and the rapid adaptation of the supply chain to the needs in case of a crisis has increased, it is predicted that the need for digitalization to take an important share in the supply chain, joint planning, and cooperation will also increase. Licensed warehouses store the products in appropriate physical conditions without exposure to any contamination and humidity. In addition, product acceptance, loading, and unloading is carried out contactless in most of the warehouses. Therefore, the COVID-19 outbreak is expected to increase the importance of licensed warehouses.

The COVID-19 outbreak is expected to cause farmers and industrialists to listen to each other more, turn to planned and contracted production, and cooperate on a case-by-case basis in times of crisis such as pandemics. After COVID-19, the number of delivery points has increased from 500 thousand to 10 million households with the decrease in out-of-home consumption and the increase in domestic consumption. The logistics industry needs investment to make micro-scale deliveries to home consumers. At the same time, as the home delivery service increases, cargo companies' needs for cold vehicles to transport perishable products will increase (TGDF, 2020).

b. Production

Problems in the supply of raw materials and auxiliary products based on imports may adversely affect production. Due to changes in consumer preferences and distribution channels, product-based increases or decreases, changes in package sizes and properties (increased tendency towards small packaging, easy-to-use packaging) are expected, so companies will have to invest in means of production in this direction. It is also predicted that companies that think they may have problems in labor supply will invest more in automation. Due to the protective policies of the countries, it is expected that the greenhouse investments that allow production throughout the year will increase.

c. Human Resources

No significant improvement is expected in the scarce labor force in agricultural production. The labor force problem persists in this sector due to rural-urban migration, low earnings, and the fact that young people do not prefer to work in agricultural production due to sociological reasons. This problem is tried to be overcome with the employment of immigrants. Agricultural labor wages are likely to rise.

It is expected that farmers will be directed to digital information services and technologies in agriculture, climate, banking, and public services during and after the pandemic period. This will both reduce the contact risk further and increase the farmer's work efficiency (KKB, 2020). It is expected that digital technologies will improve and the need for human resources for these technologies will increase after the pandemic. With the increase in e-commerce, it is predicted that the need for human resources for this sector will increase. As the seed development studies will continue to increase, it is expected that the need for experts who will work in the field of seed development such as biotechnology will increase.

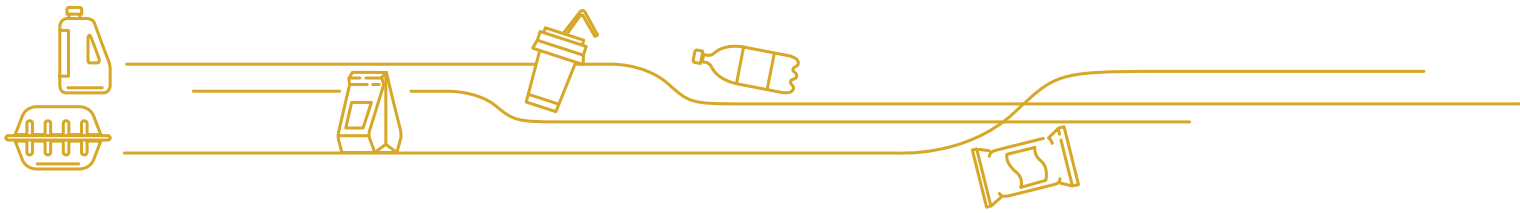
d. Sales and Marketing

Consumer preferences tend to increase towards healthy products. It is expected that the demand for functional products, fresh fruits and vegetables, high antioxidant products, organic products, medicinal and aromatic plants, fish and aquatic products, dairy products, nutritional supplements, probiotic and prebiotic products will increase. The importance of packaged products was understood in the pandemic period (TGDF, 2020). For this reason, it is anticipated that the demand for packaged products will increase and the demand for dried, frozen, canned, and packaged products with a long shelf life and ready meals that can be prepared without human touch will increase. The presentation and storage of products that will be excess supply in this way will also be beneficial in preventing food waste. It is expected that the importance of "product traceability" in terms of reliability will increase. Automation is predicted to come to the fore in terms of hygiene in packaging. It is anticipated that the demand for small packages and eco-friendly bio-intensive packages will increase, and eco-certified products will also become prominent.

In the packaging, storage, transportation stages of food after COVID-19 the presentation of products to consumers in accordance with the rules will be important. Unless farmers who directly sell their products as retail family food businesses and food tradesmen do not take this into account, they may lose their competitive advantage against large enterprises (KKB, 2020). It is expected that the momentum gained by digital marketing (e-commerce) channels, whose share in sales has increased significantly, will continue. Local supply chains will play an important role in sales operations.

e. Finance

The volatility in the exchange rate is seen as the biggest problem to be faced by the sector. If hotels, restaurants, and cafes remain closed and industrial production continues to remain low, bottlenecks may occur in the cash flows of these sectors and the companies serving these sectors. Businesses' and individuals' need for long-term loans with low interest and social assistance to overcome the cash crunch will continue. It is predicted that the use of digital technology in the financial system will increase due to the decrease in contact.



5. Trends Specific to the Food Sector

5.1. Trends in Food Sector in the World

Factors affecting the food industry and trends in the industry are explained below.

a. Income

In consequence of the global economic development, per capita expenditures in all income groups and the budget spared for high-value products such as vegetable oils, livestock products, and fish are expected to increase. However, although the budget allocated for food increases in parallel with the increase in income, the tendency of people to spend their additional income on food diminishes, and the share of food expenditures in total expenditures decreases.

Following the anticipated increase in income in the high-income group, the share of food in subsistence expenditures, which was %8 in 2019, is expected to decrease to 6% in 2029, in the low-middle income group, this share is expected to decrease from 21% to 17% and in the high-middle income group, from 19% to 14% (EC, 2016).

b. Demographic changes

i) Population Increase

Population growth is expected to be the main factor affecting the consumption of agricultural commodities. Population growth will continue to be a major factor in cereal consumption in some high-income countries where per capita food demand remains stable or even falls. Population dynamics have a lower impact on vegetable oil, sugar, meat, and dairy products, where income and personal preferences play a larger role.

ii) Aging Population

The share of older people in the total population is increasing in high-income regions such as Europe, Japan, and the USA. Elderly people have distinct features that affect food demands. Tooth loss and decreased sensory perception increase the demand for foods with high aroma and suitable texture. Decreasing appetite, muscle strength, and vision increase the need for smaller quantities, easy-to-open, small-packaged, and large-labeled food products.

The susceptibility of the elderly to non-communicable diseases such as diabetes, cardiovascular diseases, osteoporosis, and obesity increases the demand for personalized nutrition (diet specially designed for the individual's characteristics) and new products (nutritionally enriched products and functional foods).

iii) Urbanisation

The shift of population from rural areas to cities is a global trend. The expected effects of urbanization on the food and beverage industry are the increased role of supermarkets (and multinational corporations) in food sales. In addition, the change in employment within the food system is in the form of a decrease in people working in agriculture, an increase in the number of employees in food processing, shipping, wholesale, and retail.

c. Changes in consumer preferences and trust in the food supply chain

Consumer preferences regarding food depend on a wide variety of factors, including:

- Biological markers (hunger, appetite and taste)
- Economic determinants (cost, income, availability)
- Physical determinants (access, education, time and skills - such as cooking -)
- Social determinants (culture, family, peers and food habits)
- Psychological determinants (Mood, stress, guilt, etc.)
- Attitudes, beliefs and knowledge regarding food

Price remains the most important factor determining food choice. However, for consumers with higher disposable income, factors other than price can also affect consumption patterns. The wealthier a person is, the more likely his/her consumer behavior is influenced by factors such

as food safety, quality, long shelf life, non-GMO (Genetically Modified Organism), and expected health benefits.

Besides price, consumer preferences are shaped by factors related to health (allergy and intolerance, healthy lifestyle, food safety), social responsibility (local products, animal welfare), and convenience.

i) Healthcare

As more information becomes available, consumer awareness of the ties between food and health increases. This can be considered as one of the most important social developments of recent years. In addition to maintaining a healthy lifestyle, the growing interest in actively preventing disease supports the adoption of healthy diets.

Serious and life-threatening food allergies and intolerances also cause an increase in consumers' interest in food ingredients. The so-called "free-from" foods (such as lactose-free, gluten-free, or wheat-free) are increasingly consumed by people with no food allergies or intolerances.

Food safety fears such as e-coli, cattle diseases, listeria, and bird flu have made consumers more concerned about food safety. In parallel, there has been a growing interest in agricultural practices (organic, pesticide use of antibiotics, and growth hormones in livestock or crops) and processing applications (use of certain special food additives such as aspartame).

ii) Social Responsibility

Consumers place an increasing emphasis on responsible consumption, that is, taking responsibility for the effects of consumption choices on climate change, public health, social and economic inequality, biodiversity, animal welfare, and scarce resources.

iii) Organic Food

The demand for organic food is concentrated mainly in the USA (about 44% of the world market), followed by the European Union (41%). Between 2004 and 2013, the EU organic market grew from 10 Billion Euro to 22 Billion Euro with an annual growth of over 13% (EC, 2016).

Knowledge level, health, availability, and education were observed to be among the factors that positively affect the attitudes of consumers towards organic food purchasing.

iv) Change in lifestyle

Convenience is a factor in increasing the demand for the food product. With consumers' lifestyles becoming increasingly mobile and fast, the availability of suitable products such as full meals "on the go" has become a fundamental requirement. Especially the demand for healthy ready-to-eat food is increasing.

Changing patterns in lifestyle also affect the preparation of meals at home. Less time is spent on the preparation and consumption of meals at home, especially in urban areas of developed and even developing countries. The preference for processed, more easily packaged and pre-prepared foods seems to have developed in consequence of long working hours.

The increase in functional food consumption in industrialized countries is not only a result of the aging population but also a result of more intense lifestyles that make it difficult to meet nutritional needs.

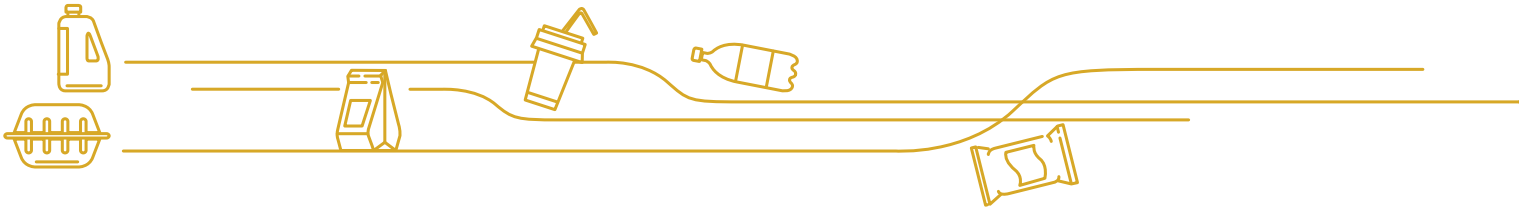
v) Trust in the food industry

An important factor affecting food choices is the perception of consumers in the face of the food chain. Food fraud and food safety incidents uncover the complexity of the food supply chain while shaking consumers' trust in the food industry. Among other factors that could negatively affect the image of the food industry, concerns have been raised about the use of antibiotics in animal production and the possible development of antibiotic resistance.

d. Trends in the supply chain

i) Modern Retail Market

A study of the impact of modern retail on consumer choice has shown that competition among retailers is intensified, especially with the development of discount retailers. The industry can



increase quality and volumes while reducing the number of middlemen. The increasing importance of the retail sector results in an increase in bargaining power in negotiations regarding the food processing industry and SMEs in particular. Fierce competition between supermarket chains and other businesses leads to the lowering of prices of products and mergers.

ii) Private brand

There is an increasing tendency for private brands (products that retailers procure or produce under their own name or brand) to enter the market. Private brands support the internationalization of the sector by providing access to wider networks.

e. Innovation

Technological developments in the food industry have the potential to facilitate food safety management, provide healthier foods, increase efficiency and render operations more sustainable environmentally. For this reason, they attract the attention of the stakeholders involved in the food supply chain, as well as marketers, media, and public policymakers.

i) Innovation in the Food Sector

In the context of the food sector, innovation may comprise new products, new types of packaging (providing consumers with information about packaging as well as physical packaging), new formulation (new preservation types, new additives, new flavors), market expansion, re-entry to the market, new marketing methods and the implementation of a new or significantly improved logistics process.

Customer needs are a powerful driving force for invention and innovation. Consumers' expectations are also the main driving force of product innovation in the sector.

ii) Innovation in Packaging

The drivers of packaging innovations include business dynamics, distribution, and retail, consumption, legislation as well as cost-effectiveness. Rapidly changing social trends and changing consumer demands are the main drivers behind food packaging innovation.

Packaging plays an important role in providing suitable food. For example, it can contribute to saving time and effort during food preparation. Ease of access to a package, the ability to use, destroy and reseal the package, and microwave heating are among the features deemed suitable by consumers. These aspects have a huge impact on package innovation. For example, the "self-doing" function in food packaging has been a response to consumers' growing preference for suitable food. “Self-doing” means packaging with options such as self-opening, self-closing, self-dosing, or self-heating.

iii) Innovation in Distribution

Digitalization is a driver for growth in food and beverage distribution. As advances in digital communication technology allow more direct communication with customers, e-commerce creates new opportunities for single-focused businesses to enter the market. For example, personalized products have developed after the spread of social media (EC, 2016).

f. Technological Developments

Technology is increasingly contributing to the journey of food from farm to table. The food industry is a very important junction in this process. The competitiveness of food industry enterprises is closely linked to their ability to apply new technologies. The most promising food technology applications, robotics, data technology, and new processing techniques are mentioned below.

i) Agricultural Technologies

The main purpose of using technologies in agriculture is to increase harvest yield by reducing the environmental impact. Promising technologies include:

Precision Agriculture; drones, robots, and satellites will assist farmers.

Breeding Techniques; New techniques (genome technologies) and climate-resistant crop varieties

Aqua culture; Technological developments in fish farming

Circular Agriculture; Technologies that support the efficient use of biomass and waste

Production of new protein sources; the use of insects, algae as a source of protein

Biotechnology; Technologies related to genetics, microbiology, and food safety

ii) Food Technologies in Industry

The main purpose of using technologies in the industry is to produce higher quality by reducing the unit cost. Promising technologies include:

• Promising Technologies in the Short Term

Robotics; The use of robots in food processing

Data technology; Big data analysis and digitalization, artificial intelligence and RFID (Radio Frequency Identification) chips

Novel production techniques; Production at high pressure, steam boiling etc.

• Promising Technologies in the Short Term

Nanotechnology; Nanoscale ingredients in food

3D printing; personalization of food production

Cell technology; Meat and fish production from stem cells (ING, 2019).

5.2. Trends in Food Sector in Turkey

a. Income

Similar to the world, as the income level increases, the consumption of animal products (meat, milk) and fish, whose prices are relatively higher than agricultural products, increases, and the share of food in the household budget decreases. The per capita domestic product increased steadily from USD 10,629 in 2010 to USD 12,562 in 2013, then entered a downward trend and decreased to 9,2 thousand USD according to 2019 data

b. Demographic changes

i) Population Increase

In Turkey, in 2019, the annual population growth rate was 1.39% (0.55% in 2020) and between the years 2009-2019 it was 1.36 % in average[14] . In the same period, it is higher compared to the world annual average population growth rate (1.10%[15]). It is predicted that the demand for food will increase with the effect of migration to increase in population.

ii) Aging Population

While the population over the age of 65 constituted 7.2% of the total population in 2010, this rate reached 9.1%[16] in 2019. The share of the elderly population in the total population is increasing.

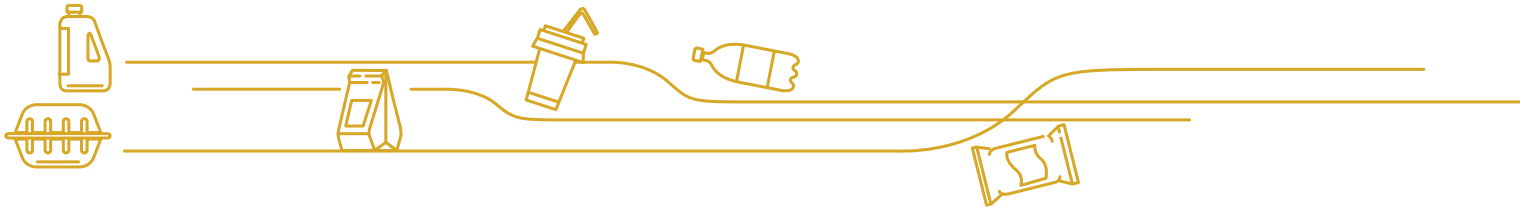
iii) Urbanisation

The proportion of the population living in the city is 56% in the world in 2019. After 1980, urbanization began to increase quickly in Turkey. While the proportion of people living in the city was 44% in 1980, this rate reached 76% in 2019, exceeding the world average (WORLDBANK, 2021).

c. Changes in consumer preferences and trust in the food supply chain

Urbanization, increase in education level, easy access to information thanks to digital technologies cause changes in consumers' preferences. The demand for healthy and organic products has gained momentum after the COVID-19 outbreak. Demand for ready meals and packaged products increases because of the reduction in the time allocated to food preparation due to industrialization and greater participation of women in working life. Imitation and fraud in the food sector can shake the trust in the food sector.

14- Calculated based on the data of TURKSTAT (Provincial population by years, 2000-2020)
15- Calculated based on World Bank data (https://data.worldbank.org/indicator/SP.POP.TOTL)
16- Calculated based on TURKSTAT (Population according to province, single age, and sex, 2007-2020) data.



d. Trends in the supply chain

With increasing urbanization, retail chain stores (organized retail) has increased in Turkey. In Turkey, as well as in the world, the bargaining power of chain stores against SMEs is high. Sector representatives state that an oligopolistic structuring has been formed in retailing and that there are price and maturity pressures on manufacturers and industrialists. The tendency of stores to use their own private brands is also spreading.

e. Innovation

In Turkey, among the factors that encourage innovation, the leading is to enter new markets, to meet consumer demands and requirements, and rival companies. The main innovation activities are the development and improvement of existing products, the adaptation of products with the markets, the development of new products, and the development of existing production technologies. It can be said that the basis of food companies' making more innovations in production techniques compared to other innovations is to improve their quality and costs (Bülbül, 2007). With the effect of the COVID-19 pandemic, the demand for packaged products with a long shelf life has increased, which increases the need for innovation in these areas. The impact of the pandemic has also led to an increase in the use of developing digital marketing channels.

5.3. Trends in the Food Sector in the TR21 Region

According to TURKSTAT data (2020), when the region's share in Turkey's total production is considered, canola (64%), paddy (44%), sunflower seeds (43%), forage peas (16%), wheat (10%), vetch (9%), wheat-greenery (7.6%), meadow grass (6.1%) and triticale (5.3%) and among aromatic herbs lavender (5%) and sage (4%) constitute the major plant production items of TR21 Region.

Fruit production in the region is low. Wine grape (6,5%) constitutes Turkey's most important item regarding the shares in Turkey's total production. This is followed by walnut (2,7%). The same is true for vegetables. Pumpkin (3.7%), watermelon (3.2%), and leek (3%) are the first three products produced with the highest amount.

In stock farming, pure culture dairy cattle (4,4%) and merino (6%) come to the fore regarding their share in Turkey's current number of animals. Since the TR21 region is declared a free zone and modern stock farming is carried out in the region, it becomes important for the production of meat and dairy products with high added value. Poultry and egg breeding are not developed in the region.

Being the gateway of the country to Europe, being close to metropolises with major markets, foremost being Istanbul, being the region least affected by climate change and the development of its industry create opportunities and competitive advantages.

Demographic and income data affecting the total food consumption according to TURKSTAT data are given below:

Tekirdağ population growth rate has been markedly above the average of Turkey. The annual population growth rate in Tekirdağ was 2.47% in 2019 and 2.43% in 2020, reaching 1.1 million. In Kırklareli, on the other hand, a decrease in the population is observed. The population decreased to 279 thousand with a decline of 1.25% in 2019 and 1.52% in 2020. In Edirne, although the population increased by 0.56% in 2019, it was 408 thousand with a decrease of 1.48% in 2020.

The elderly population rates vary in the provinces of the region. Tekirdağ has a fewer elderly population than the average of Turkey, while in the opposite direction, Kırklareli and Edirne have a higher elderly population than the average of Turkey. However, the share of the elderly population in the total population has increased in the 2010-2019 period in all provinces in the Region[17].

According to the data of 2019, domestic product per capita in Tekirdağ was quite above the average of Turkey (9.2 thousand USD) with 12.4 thousand USD. Though not in the same amount as in 2019 in Kırklareli, domestic product per person (10 thousand USD) was above the average in Turkey. However, in Edirne the situation is in the opposite direction. The per capita domestic product in Edirne in 2019 was 7.8 thousand USD.

17- Population rates of 65 and over in the provinces of the TR21 Region: Tekirdağ; 2010: 7.3% - 2019: 8.7%, Kırklareli; 2010: 11.3% - 2019: 13.8%, Edirne; 2010: 11.4% - 2019: 14.5%.

6. Current State of the Sector

6.1. Primary Research Results

6.1.1. Survey Study

156 companies operating in the Food Products Manufacturing (Food Industry) participated in the survey. 18 companies participated in the TR21 Region. The participants in the survey regarding TR21 Region, country, province, and sub-sectors are given in Table 23. 145 enterprises, which participated in the survey throughout Turkey shared the firm scale information. Accordingly, 61 of the participants are micro, 49 are small, 32 are medium and 5 are large scale.

The weighting of the answers given to the survey questions;

It is designed as Very Low: 0, Low: 1, Medium: 2, High: 3, Very High: 4.

Table 23: *Distribution of the Companies participating in the survey in TR61 Region and Turkey*

Total		Turkey	TR21	Tekirdağ	Edirne	Kırklareli
		156	18	7	6	5
NACE Code	Sector	Sector Total				
		(TR)	(Region)			
10.1	Processing and storage of meat and manufacture of meat products	18	2	1	1	
10.2	Fish, crustaceans and mollusks processing and storage	4				
10.3	Processing and storage of vegetables and fruits	24	1	1		
10.4	Vegetable and animal oils and fats	6	2	1		1
10.5	Manufacture of dairy products	15	4	2	1	1
10.6	Manufacture of ground grain products, starch and starch products	12	2		1	1
10.7	Manufacture of bakery and bakery products	22	2	1	1	
10.8	Manufacture of other foodstuffs	49	4	1	2	1
10.9	Manufacture of ready animal feeds	6	1			1

The sustainability of raw materials is one of the most important factors in Food Products Manufacturing. When the Contractual Planting application, which is one of the important tools used to reduce the raw material supply risk, was questioned in the survey, 71% of the 133 companies who answered the question stated that they did not carry out contractual planting. It meets 90% and more of the raw material need of only 5% of the companies with contractual planting. In the vegetable-fruit processing sector, where contractual cultivation is common, the contractual planting rate has been calculated as 58%. As for the TR21 Region, 17 participants answered the question and 2 companies stated that they made contractual planting agreement.

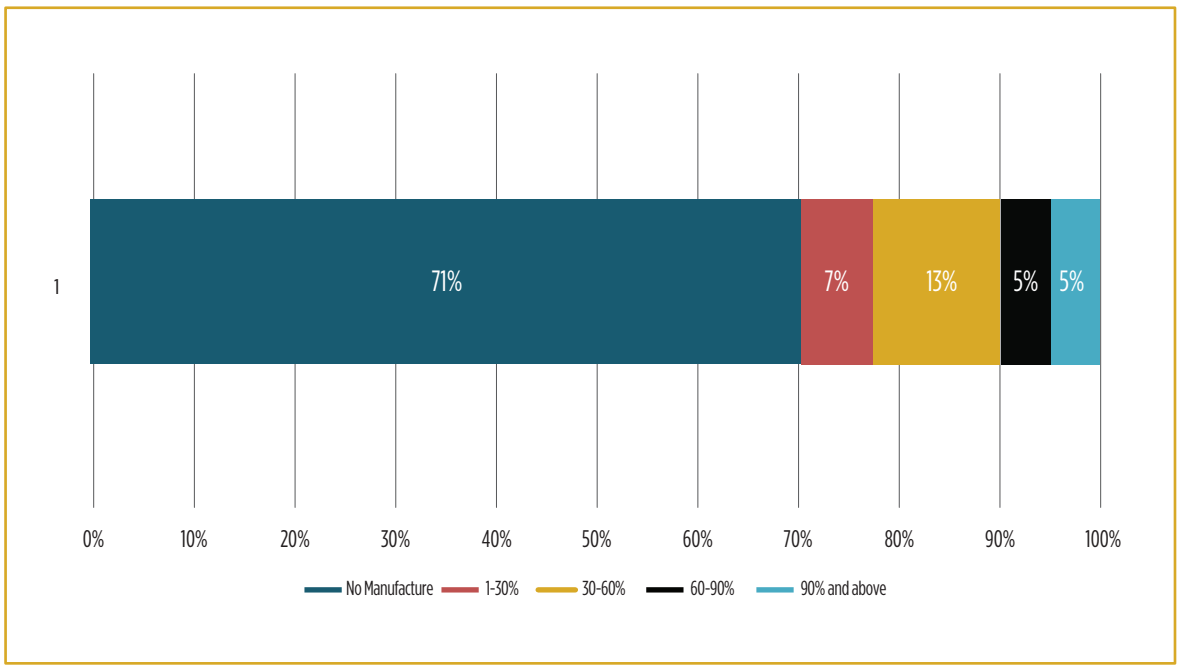


Figure 16: *Contractual Planting Firms (The Amount of Covered Raw Material %)*

When the production competencies of the enterprises in TR21 Region are questioned, it is seen that the productivity studies (Lean production, Kaizen, 5S method etc.) are limited. Only three companies stated that they use the Enterprise Resource Planning program, which is an important digital technology application. The production technology infrastructure of the enterprises is found not to be at a good level. Although enterprises are in a better position in packaging technologies compared to other production technologies, it is understood that there is also a high need for improvement in this regard. The same is true for opportunities of access to technology providers (Figure 17).

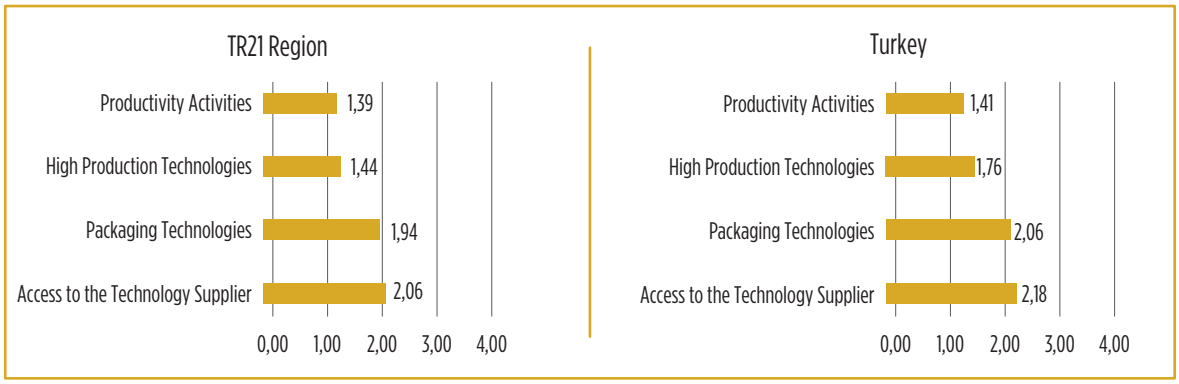


Figure 17: *Production Competence of Businesses*

It is seen that the companies participating in the survey in the TR21 Region have high competencies in Quality Control activities. It has been observed that companies attach importance to certification (TSE, HACCP, ISO 9001, etc.) and have obtained the necessary certificates. When the companies were asked about their competitive side by giving the right to mark more than one option, 95% of the companies that answered the question included the "Product Quality" factor in their most competitive side. This was followed by "Service / Delivery speed" and "Production Flexibility" factors. (Figure 18).

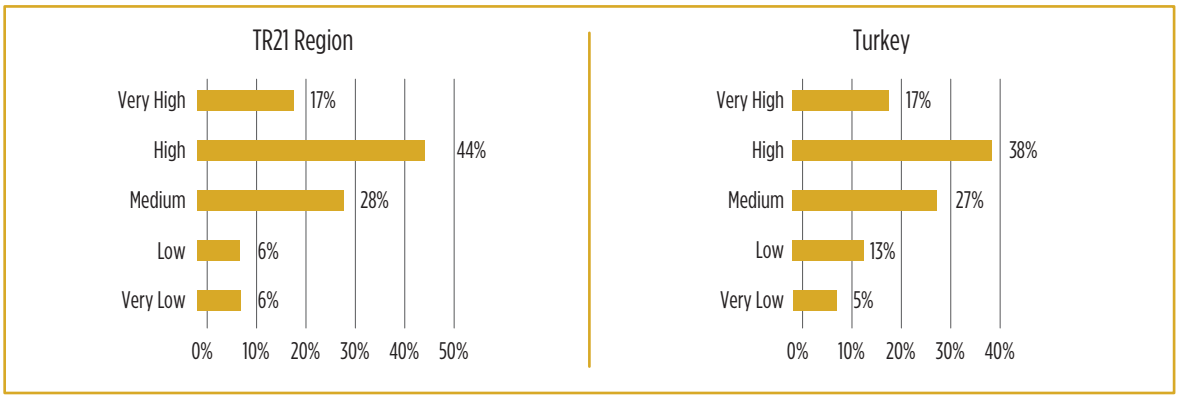


Figure 18: *İhe Systematicity of Quality Control Activities of Enterprises*

The traceability system includes the stages of identifying all products and inputs, units or parties, collecting and storing information about where, when, and where they move, and establishing a system that will link these two data (Yaralı, 2019). It is seen that the awareness of product tracking systems in the TR21 Region has begun to settle among companies. A significant portion of the companies (61%) reported that the competence in this area is high and very high. As the awareness of food safety among consumers increases, the importance of traceability also increases. Since it is expected that there will be an increase in demands for traceability after the COVID-19 pandemic, it will be appropriate for companies, which have a low level of competence in this regard to invest in this area (Figure 19).

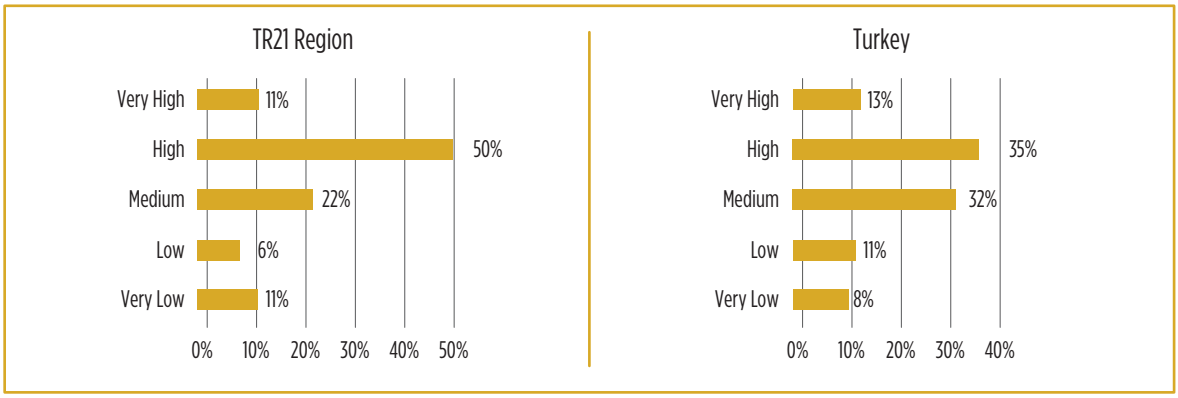


Figure 19: *Product Tracking System of Enterprises*

It was found that the area in which the companies' level of competence is the lowest in the TR21 Region and throughout Turkey are R & D / P & D activities. While the infrastructures of the companies are not sufficient for R&D activities, companies also reported that they do not have sufficient qualified personnel. Companies also have difficulties in accessing analysis and consultancy firms that will support these studies. That R&D and innovation activities are not carried out systematically indicates that the companies do not show interest in this issue. The fact that a significant portion of the enterprises (45%) stated that they do not allocate a budget for R&D and innovation activities, emphasized the weakness in this area (Figure 20).

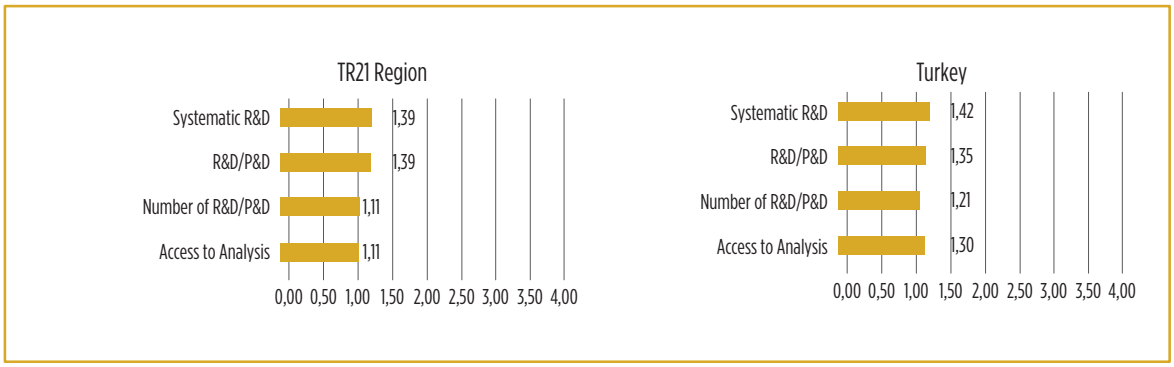


Figure 20: *R&D / P&D Competence of Enterprises*

External stakeholders play an important role in increasing the company's competencies and accessing up-to date knowledge. It is seen that in the TR21 Region, knowledge sharing is mostly made with customers and suppliers, followed by engineering/consultancy firms and competitors, respectively. Collaboration with university-research institutions is very low. When companies were also asked about the sources of knowledge they use, customers, suppliers, fairs, and universities came to the fore. The region differs positively from the country in general in terms of universities' use as a source of knowledge. The widespread use of magazines, publications, and training as a source of knowledge will provide important contributions to companies.

In order to increase the R&D / innovation activities, which have a high contribution to competitiveness, there is a need to expand the knowledge resources of enterprises and to improve their cooperation with universities. Non-strategic information is shared free of charge by suppliers with the motive to sell products and by customers with the motive to reduce supplier risk and improve product quality. It is understood that there is a need to develop financial support mechanisms to improve cooperation with universities and engineering/consultancy firms, where knowledge sharing is costlier (Figure 21).

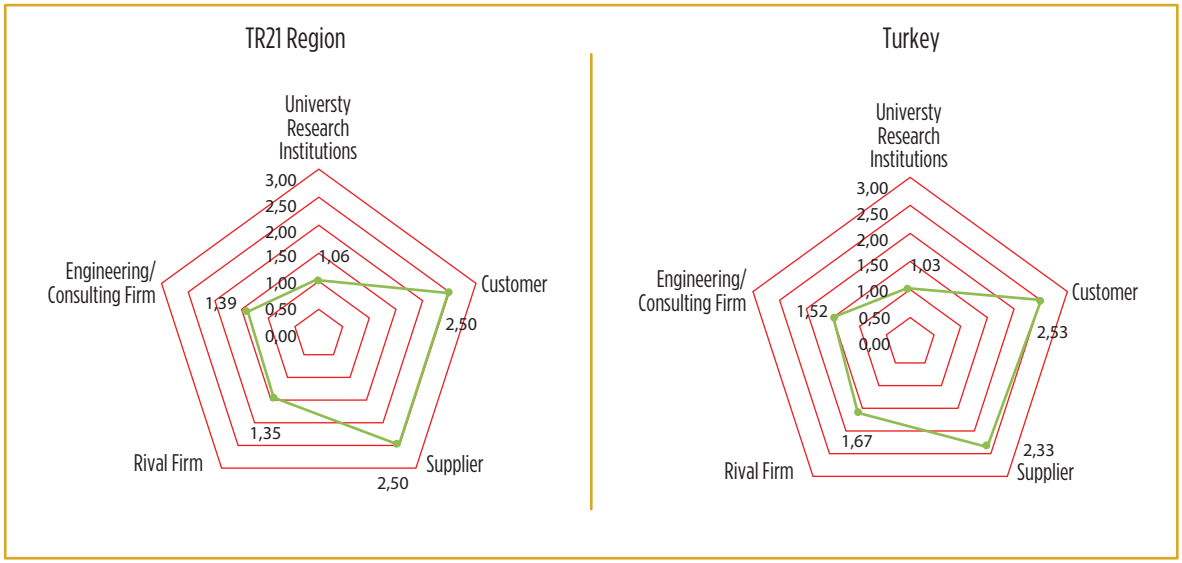


Figure 21: *Knowledge Sharing Density of Enterprises with Stakeholders*

It is seen that one of the areas that companies should develop in the TR21 Region is human resources management. According to the results of the survey, the majority of the companies (88%) are at medium and below level regarding the ability to retain qualified personnel. This situation shows that companies need improvement in their human resources policies and practices (Figure 22).

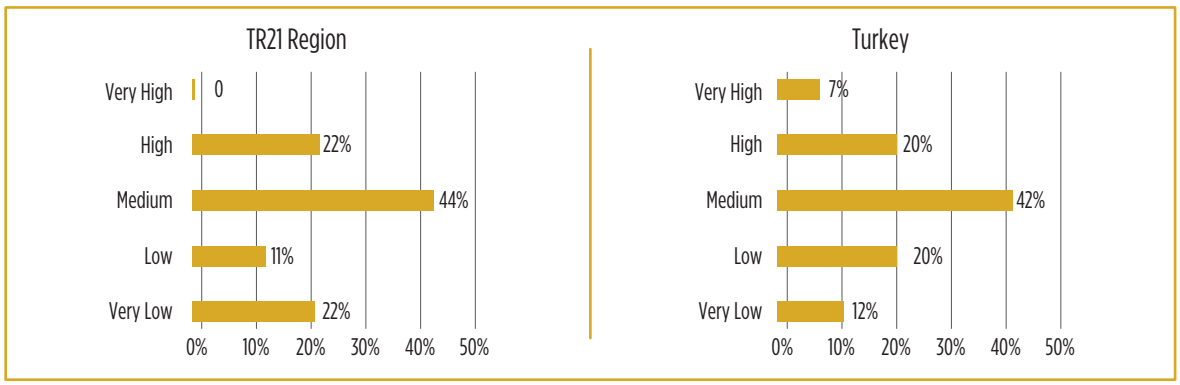


Figure 22: *The Ability of Enterprises to Retain Qualified Personnel*

When the marketing/sales competencies in the TR21 Region are questioned, given the importance that companies give to Quality Management, it is seen that brands' preferabilities are close to a high level slightly above the average of Turkey. Although companies are above the middle level regarding the systematicity of their marketing and sales strategy development activities, this situation has not been reflected in the market diversity, efficiency of distribution channels, and intensity of promotional activities. In addition, when enterprises were asked about their digital marketing activities, it was observed that the majority of them use websites and social media for promotional purposes and the use of digital marketing tools in their sales activities is not common. Companies should carry out their marketing strategy studies more systematically and develop new strategies in the areas that are found to be insufficient in these studies as a result of the analysis mentioned above (Figure 23).

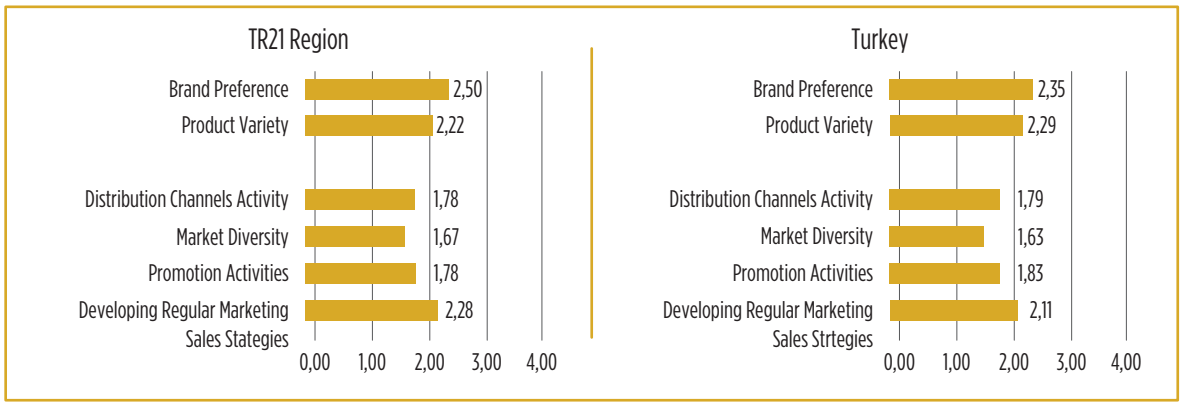


Figure 23: *Marketing Competence of Enterprises*

It was observed that the companies participating in the survey performed poorly in exports in the TR21 Region. It is seen that a significant portion of the firms (59%) do not export (Figure 24). It has been observed that most of the companies that do not export are micro and small scale. Across Turkey, 60% of the companies that do not export are micro-scale and 25% are small-scale companies. That the number of exporting companies increases as the size of the company grows indicates that micro and small-scale companies cannot export due to the lack of resources. It is seen that companies aimed at this field are in need of finance, information, and human resources.

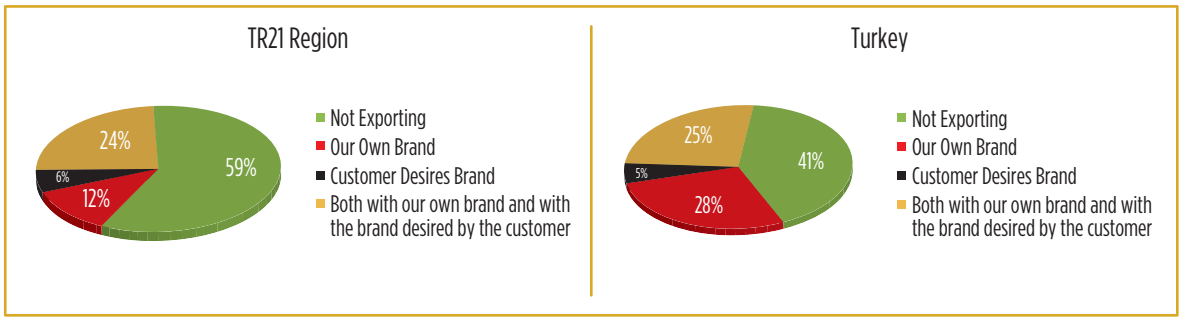


Figure 24: *Exporting Businesses and Their Brand Preferences*

When the companies that do not export in TR21 Region were asked about the reasons why they cannot export, the lack of information on foreign markets came to the fore as the most important factor. This was followed by financing problems. In a similar manner, across Turkey, lack of information about foreign markets came to the fore with the highest rate (30%) among the reasons why companies cannot export. Capacity and technology insufficiencies (20%) are in the second place. Financing problems and difficulties in certification are also important, although not as much as other problems.

It was stated that the biggest problem of companies that cannot work at full capacity is insufficient demand (internally and externally). This situation coincides with the low market diversity of companies. Insufficient financing is also among the important problems affecting companies. The same reasons are also prevalent in the TR21 Region.

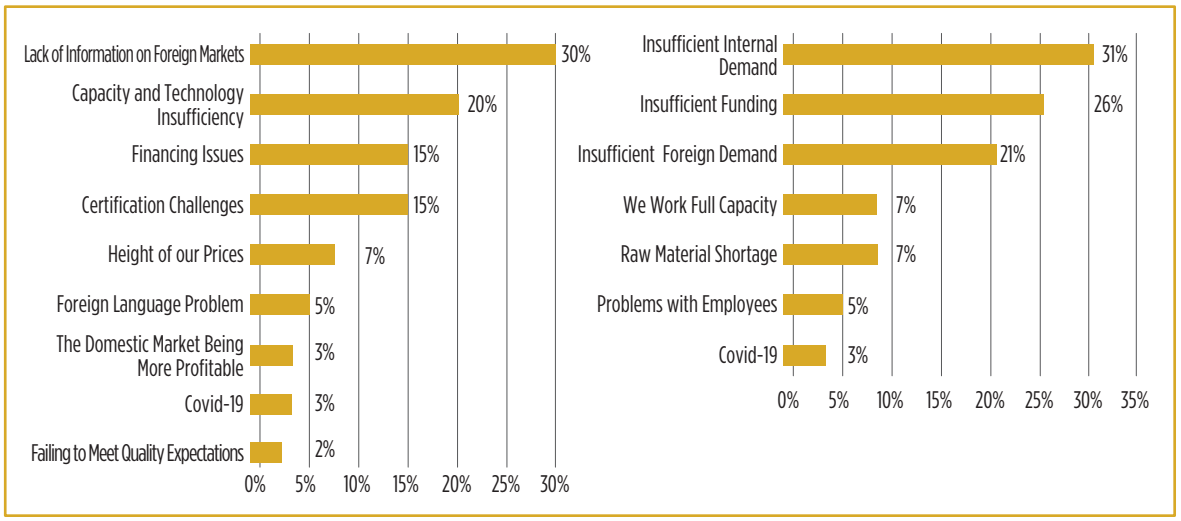


Figure 25: *Turkey-Reasons for Companies' Inability to Export and Work in Full Capacity*

When asked about the bottlenecks affecting their businesses the most in the TR21 Region, access to finance, packaging and logistics, marketing, and sales factors were mentioned first. This situation coincides with the low level of packaging technologies and marketing competencies of the companies.

In parallel with the main problems and bottlenecks faced by enterprises, it has been stated that the public can be more efficient in terms of access to finance, business support services, and access to new markets compared to other issues (Figure 26).

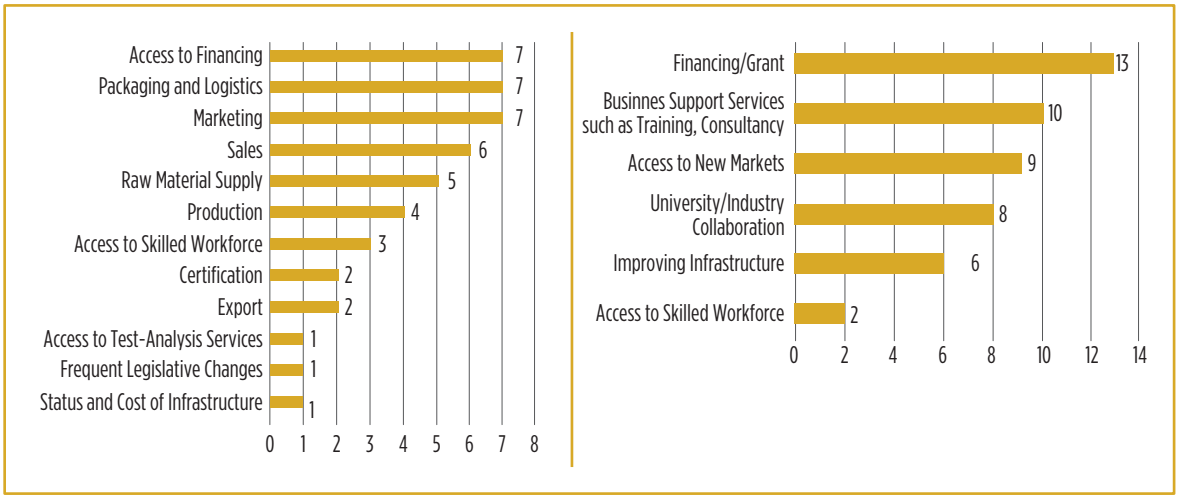


Figure 26: *Bottlenecks Affecting Enterprises and Support Expected from the Public*

6.1.2. Focus Group Meetings

Focus group studies were organized in seven regions defined within the scope of the project in order to ensure the participation of sector stakeholders within the scope of the study and in order to integrate the highest possible sectoral view on the project outputs. The information obtained at the meetings was taken into account in the analysis and preparation of the report in relevant places. The meetings were carried out under 3 main headings. The main topics that stand out under these headings are as follows. The summary of the meeting with details and the participant list is presented in the Appendix.

1- Effects of the COVID-19 pandemic on the Food Industry

The Horeca (hotel, restaurant, cafe) sector has suffered seriously due to the disappearance of the demand for hotels in Antalya and Istanbul. The food industry has been adversely affected by the closure of universities and schools, and the serious decrease in demand for hotels. Due to the closure of the restaurants, the products in the warehouses have been evaluated by donating to aid agencies.

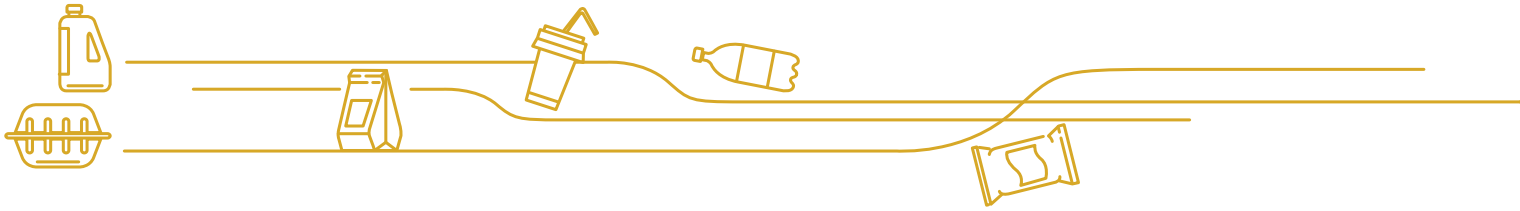
There has been an increase in market sales. However, as the sellers' power of bargaining with the markets is low, there has been a decrease in profitability. There has been an increase in sales through electronic commerce. However, it is necessary to expand the digital platform for the sale of agricultural products. During this period, the demand for durable products and healthy products such as fresh fruits and vegetables has increased. There was also an increase in export-based sales. The problems experienced in import showed the importance of localization.

Due to the shortage of personnel, enterprises have thought of downsizing.

It is expected that the price increase in food will continue after the pandemic due to the depletion of natural resources worldwide. Therefore, priority should be given to meeting the needs of the internal market. In this context, measures must be taken. For example, customs duty may be imposed on exports of crops such as wheat, barley, and corn.

2- Sustainability in food Industry, agriculture and stock farming

Forest and agricultural lands are being transformed into cities and industrial lands. This situation causes socio-ecological problems. Urban heat island and hoses are effective in the region. Transporting water through open channels causes great losses. In the region, water is used more in the industry than in the field and industry-based water losses are experienced. It should be ensured that clean but hot wastewater of the industry is recycled. Industrial facilities' being established on agricultural lands, their consuming and polluting underground water pose a danger for primary



production. Agricultural lands are getting barren. Factory wastes cause environmental pollution and harm human health.

The depletion of groundwater poses the risk of distressing non-grain production, industry, and domestic consumption. With the introduction of the Deep Discharge Project, it is ensured that the industrial waters in the Ergene Basin are collected, treated, and discharged into the sea. The milk processing plants in the region flow their whey to rivers as they avoid logistical costs. Whey processing plant is idle.

Climate change is expected to cause difficulties, as agriculture is dependent on rainfall. Efficient production cannot be realized due to the small size of the farming areas. Erosion occurs because most of the agricultural land is used above its capacity. The farmers' knowledge is insufficient. They do not consider the seed and drug recommendations. There is unconscious drug use.

There are problems in the agricultural workforce. It has been reported that some people prefer not to work because they receive social assistance and young people find the minimum wage low. It was stated that corn production was started instead of vegetables as there were no workers to work in the field during the harvest. Mainly sunflower, grain, paddy and corn are grown in the region. Paddy and corn require a lot of water.

In order to improve agricultural activities;

- Studies should be made to recycle the water.
- Meriç Project should be activated in order to reduce the pressure on groundwater.
- For efficient use of water in agriculture, it should be charged according to the usage volume, not per hectare. Excessive use of water both damages the field and causes groundwater problems.
- Fines should be imposed for factory wastes and industrial wastewater should be inspected.
- Thrace should be declared a protected area as it is not affected by climate change too much.
- Training should be organized for farmers. Unconscious drug use should be reduced.
- Application farms and training centers should be established. Incentives should be created to ensure participation.
- Good agricultural techniques should be applied to increase organic matter.
- The pattern of the product can be changed.
- Investments should be made for technological infrastructure.
- Enterprises need to be transformed into large or medium-sized enterprises.
- Stock farming should be done by grazing on the pasture due to the increasing feed prices. Forests should be opened to grazing.

3- Industry's general problems and solution suggestions

A Digital Market Platform has been established under the guarantee of the Ministry of Agriculture and Forestry for marketing primary products. This system should be expanded regionally and nationally. Seed studies are carried out on demo lands at the Agricultural Research Institute in Thrace. Educational support can be provided to farmers and companies from universities and research institutions in the region, who are experienced in the agri-food sector.

A HACCP condition has been introduced in exports to ensure the hygiene conditions required for healthy food production. This practice should be rendered mandatory for enterprises and enterprises should be audited more frequently. Training should be organized and incentives should be created on this subject.

New areas in food stand out in terms of traceability and sustainability. The issue of climate should be included in agricultural policies. Priorities should be determined for productivity in agriculture. High value-added products need to be increased. Integration to food logistics should be provided.

Policies should be developed to direct young people to rural areas. In agricultural production, the share of the producers from income should be increased and their organization should be ensured.

Cooperatives should be encouraged. The industry based on agriculture needs to spread to the rural areas.

Cheese cluster studies have been carried out in the region, but no yield has been obtained. Clustering was achieved in seeds under the coordination of the Seed Association and the Agency. It is planned to implement a guided Hybrid Seed (sunflower, corn) R&D project together with Trakya Tohum Inc.

Since animals are prohibited from entering the region starting from the Bosphorus, the region has been declared a free zone, so companies in the region can sell meat and dairy products to the EU more easily. Some of the products specific to the region have received a geographical indication, but there is a lack of branding. The geographical indication should be expanded for other products. The issue of branding should be given importance.

6.2. Industry Analyses

6.2.1. Food Industry Value Chain Analysis of TR21 Region

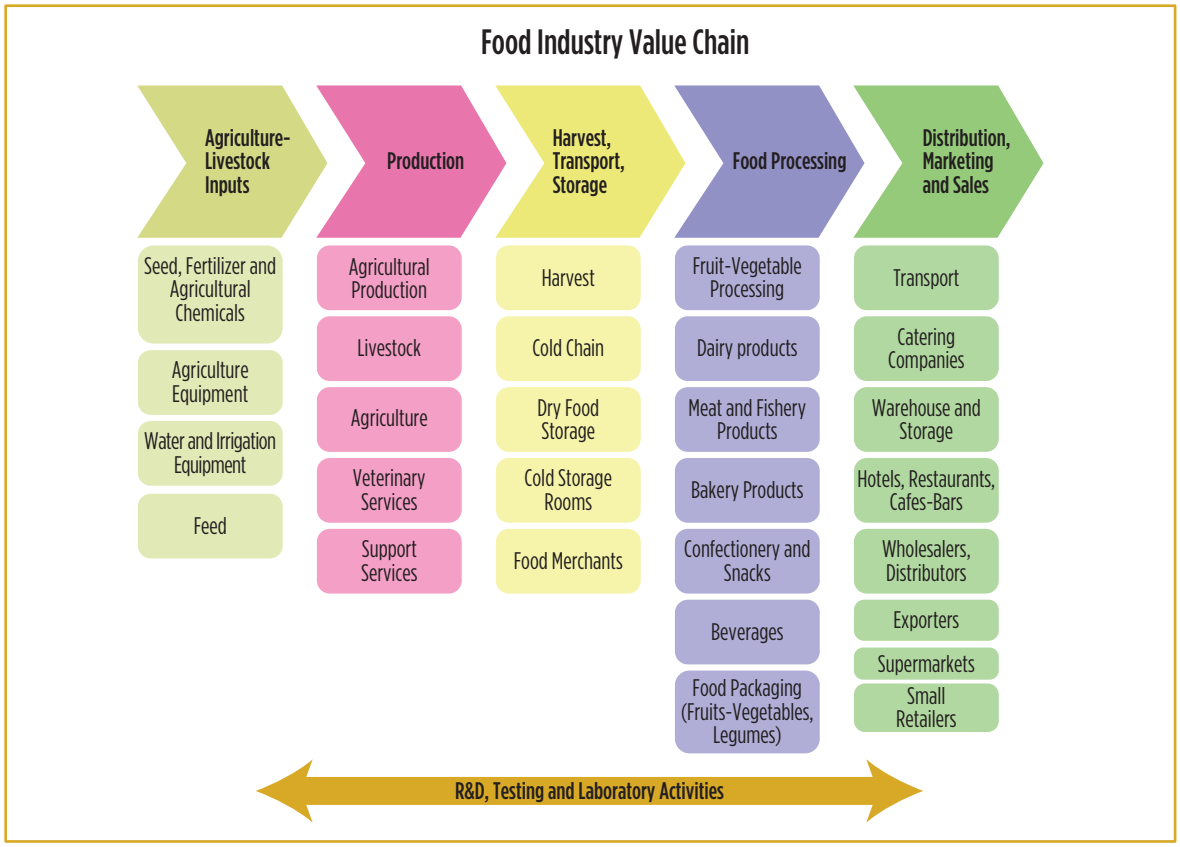
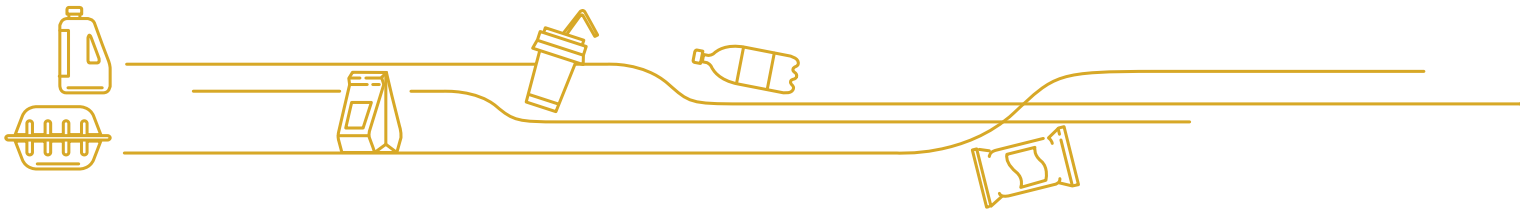


Figure 27: *Simplified Food Industry Value Chain*

a. Agriculture-Livestock Inputs

Fertilizer producers in Turkey obtain raw materials by importing or from local sources, while also importing final products from international suppliers. Approximately 20-50% of Turkey's fertilizer need is met through imports. The country does not have the sources of raw materials used in chemical fertilizer production. About 95% of the main inputs such as natural gas, phosphate rock, potassium salts are met by imports (TAGEM, 2018).

Although Turkey produces grain and oilseeds used in compound feed, the production cannot meet the demand. According to 2016 data, approximately 3 billion USD worth of feed raw material



was imported in compound feed. Soybean and Soybean Residues constituted the largest item with USD 1.15 Billion. Feed Additives also have a large share in imports with USD 526 million (TÜRKİYEM-BİR, 2017).

Roughage is any material that has a water content of more than 14% in natural state or a raw fiber content higher than 16-18% in dry matter. Meadows and pastures are very important roughage sources in animal nutrition. It turns out that the livestock in Turkey cannot be fed sufficiently, balanced and productively. It is understood that the high quality roughage produced in total cannot meet the needs of the livestock and the deficit has reached approximately 60%. The negative effects of the effective use of straw and stubble wastes in the country instead of quality roughages, which will increase animal health, performance and consequently production and consumption, are still seen in the livestock and feed industry. The industry is trying to meet the roughage deficit with straw and stubble. In order to provide the quality roughage required by the livestock industry, it is necessary to increase the production of forage crops and silage, as well as to increase the grazing capacity by improving the pastures, highlands and winter pastures, which are one of the most important resources of Turkey (Özkan, 2016).

Turkey's annual consumable surface and groundwater potential is 112 billion m3 and annual water consumption is 54 billion m3 (DSI, 2018). 40.0 billion m3 (74%) of this amount of water is used for irrigation, 7 billion m3 (13%) for drinking and service, and 7 billion m3 (13%) for meeting the industrial water requirements. Irrigation efficiency in the agricultural sector is at the level of 51% (TOB, 2019a).

The amount of land that can be irrigated technically and economically in the country has been calculated as 8.5 million ha and 6.6 million ha of this area has been opened to irrigation as of 2019. As of 2018, 37% of the existing irrigation networks are used in classical, 41% canalette and 22% with pipe systems. The use of irrigation methods and techniques that ensure efficient use of water in the country is low. Traditional open canal and canalette systems are common in irrigation networks of the country. In areas dominated by these systems, the transmission and distribution efficiency is 60%, the water application efficiency is 50% and the total project efficiency is around 30%. Approximately 70% surface, 17% sprinkling and 13% drip irrigation are used in irrigated lands in Turkey (ZMO, 2020).

As of 2017, it has been determined that approximately 33% of the total tractors in the pool are used economically in agricultural activities (TARMAKBIR, 2020).

Box 1: *Water Management*

It was also mentioned in the focus group meetings that water management and its efficient use is one of the most important problems for the sustainability of food. It was stated that losses up to 65% occur during water transport through open channels, that some of the farmers tend to give more water than the plant needs with the traditional wild irrigation method (traditional flood irrigation), this situation disrupts the structure of the fields, causes erosion, creates a drainage problem and thus reduces the production efficiency. It was stated that water transportation should be carried out through closed canals, the spread of modern irrigation techniques (underground drip irrigation, overground drip irrigation, sprinkling), and that the farmer should be directed to saving by abandoning the method of calculating the water fee per decare currently applied, and pricing is made according to the volume of water consumed. It was also stated that the need for a pump in pressurized irrigation methods can be eliminated with a suitable system by taking advantage of the pressure created by the water that is transported from high altitude regions to lower levels.

b. Agricultural Production

Plant Production

There is 23.4 million hectares of agricultural land in Turkey. The number of agricultural lands per enterprise is 5.9, and the average size of land is 12.9 decares (2016). The amount of land per agricultural enterprise in the EU is 161 decares (2013) (Semerci, 2016).

The fact that agricultural lands in Turkey are generally composed of small parcels, and that these parcels are not together but scattered, significantly reduces the level of efficiency in the use

of agricultural mechanization tools. In addition, the excess number of agricultural enterprises decreases the income per enterprise.

It is seen that low productivity is one of the main problems of the agri-food industry. In many products that have an important share in the food and livestock sector (wheat, barley, oats, sugar beet, triticale and tomatoes), the yield is low compared to France and Germany from EU countries (Table8).

In order for Turkey to reach the level of EU countries in terms of productivity in agricultural production, it is necessary to solve the problems arising from the infrastructure of agricultural production and to increase the share of agricultural enterprises that make production based on economies of scale. In parallel with these, the dependence on natural conditions in agricultural production should be reduced, production materials with more qualified, high yield value and more resistant to dry conditions should be developed and their use should be encouraged, and emphasis should be placed on increasing the amount of irrigated land throughout the country in line with the planned targets every year (Semerci, 2016).

Table 24: *Yield in Cereal and Some Herbal Products (kg/decare - 2019)*

	Yield in Cereal and Some Herbal Products (kg/decare) - 2019									
	Wheat	Barley	Egypt	Oat	Soy	Sunflower	Sugar beet	Triticale	Tomato	Olive
France	774	698	853	460	262	215	8.514	538	12.531	133
Germany	740	678	881	411	291	204	7.274	613	27.356	0
Spain	315	288	1.173	186	329	111	9.121	239	8.782	229
Europe	427	395	723	250	209	220	6.141	383	5.383	207
Turkey	278	266	940	242	425	279	5.832	336	7.076	173

Source: *FAO; http://www.fao.org/faostat/en/?#data/QC*

Between 2000 and 2018, Meadow and Pasture Lands increased by 517 thousand hectares, and the permanent crop land used in fruit cultivation increased by 909 thousand hectares. The total of temporary crop land and fallow land used in the cultivation of cereals and other field crops, defined as arable land, decreased significantly (4.10 million hectares) (Table 25).

There has been a very serious decrease of approximately 2.50 million hectares in wheat cultivation areas. There was also a high decrease in barley, cotton and sugar beet cultivation areas. It is seen that some of the producers have turned to sunflower and corn cultivation. With the increase in productivity, it has been ensured that the production amount in wheat did not decrease, and increased in sugar beet (Table 26). However, taking into account that the population increased by 22% during this period, it can be said that the per capita production amount for wheat and barley decreased at the same rate. According to the data of the Directorate General of Migration Management in 2019, considering the 3.6 million Syrians under temporary protection, it is seen that per capita production has decreased significantly.

Table 25: *Distribution of Turkey's Land Area*

	Turkey Land Area (1.000 hectares)								
			(1)+(2)+(3)+(4)	(1)+(2)+(3)	(1)+(2)	(1)	(2)	(3)	(4)
	Forest land	Other Land	Farmland	Field	Arable land	Tempo-rary crop land	Fallow land	Perma-nent crop land	Mead-ow, pas-ture
2000	20.148	16.336	**40.479**	26.379	**23.826**			2.553	14.100
2010	21.083	16.868	39.012	24.395	21.384	17.135	4.249	3.011	14.617
2018	21.908	17.253	**37.802**	23.185	**19.723**	16.210	3.513	3.462	14.617

Source: *FAO, http://www.fao.org/faostat/en/#data/RL*

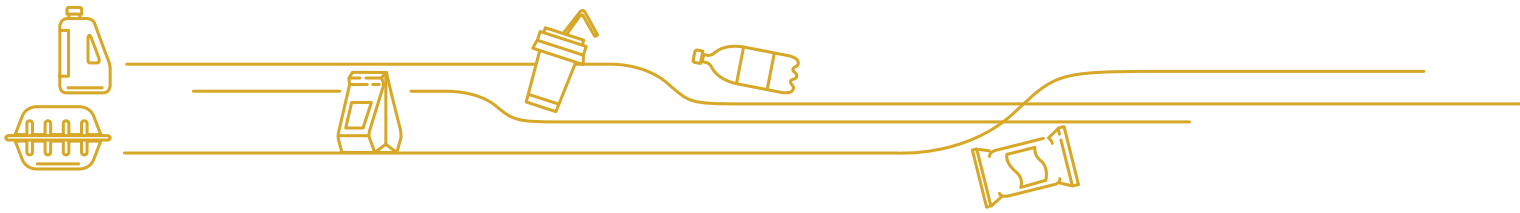


Table 26: *Land Planted, Production Amount and Yield Data on Selected Crops in Turkey*

Planted area (Decares)	Total	Wheat	Barley	Egypt	Sunflower	Cotton (Stubby)	Sugar beet
2001	150 934 280	93 500 000	36 400 000	5 500 000	5 100 000	6 846 650	3 587 630
2010	131 886 169	81 034 000	30 400 000	5 940 000	6 414 000	4 806 500	3 291 669
2019	118 985 163	68 463 271	28 690 715	6 388 287	7 526 318	4 778 681	3 137 891
Increase/ Decrease (2001-2019)	-31 949 117	-25 036 729	-7 709 285	888 287	2 426 318	-2 067 969	-449 739
Increase/ Decrease (2001-2019)	-21%	-27%	-21%	16%	48%	-30%	-13%

Production (tons)	Total	Wheat	Barley	Egypt	Sunflower	Cotton (Stubby)	Sugar beet
2001	44 340 414	19 000 000	7 500 000	2 200 000	650 000	2 357 892	12 632 522
2010	52 646 112	19 674 000	7 250 000	4 310 000	1 320 000	2 150 000	17 942 112
2019	54 954 320	19 000 000	7 600 000	6 000 000	2 100 000	2 200 000	18 054 320
Increase/ Decrease (2001-2019)	10 613 906	0	100 000	3 800 000	1 450 000	-157 892	5 421 798

Yield (Ton / decare)	Total	Wheat	Barley	Egypt	Sunflower	Cotton (Stubby)	Sugar beet
2001	0,294	0,203	0,206	0,400	0,127	0,344	3,521
2010	0,399	0,243	0,238	0,726	0,206	0,447	5,451
2019	0,462	0,278	0,265	0,939	0,279	0,460	5,754
Increase/ Decrease (2001-2019)	0,168	0,074	0,059	0,539	0,152	0,116	2,233
Increase/ Decrease (2001-2019)	57%	37%	29%	135%	119%	34%	63%

Source: *TURKSTAT*

In the table below (Table 27), the possibility of producing all of the products imported in Cereals and other main Herbal Products in Turkey has been calculated. "Usable production" refers to the net production amount after the losses are deducted. With the assumption that production will be made with "current yield", the amount of additional land required to meet all imports is calculated as 5.61 million hectares. It is seen that 3.51 million hectares of fallow land cannot meet this need. In case of trying to meet the imports by increasing the yield on the production land (without using fallow lands), the required yield increase is given in the last column. When compared to the yields of developed countries, it is seen that the results for wheat and barley are achievable. For wheat and barley, it would be more appropriate to focus on increasing productivity rather than increasing the amount of cultivated land. When wheat and barley are excluded, it is seen that the land width needed to meet the imports of the listed crops (sunflower, corn, legumes, soy, cotton, etc.) is 2.9 million hectares and it is less than the amount of fallow land.

Table 27: *Analysis of Turkey's Imports to Meet Domestic Production in Cereals and Other Herbal Products*

"Cereals and Other Herbal Products", 2018 / '19							
Product	**Usable production (Ton)**	**Cultivated area (Hectares)**	**Yield ton / hectare**	**Import (Ton)**	**Land (hectares) needed to meet imports (Excluding Wheat-Barley)**	**Efficiency Needed to Meet Imports**	**Needed Efficiency Increase**
		13.246.832			**5.610.463**		
Wheat	18.900.000	7.299.271	2,59	6.467.562	2.497.804	3,48	34%
Barley	6.580.000	2.611.940	2,52	521.510	207.014	2,72	8%
Egypt	5.529.000	591.900	9,34	3.682.366	394.211	15,56	67%
Oat	257.920	105.825	2,44	1.650	677	2,45	1%
Rye	315.840	110.903	2,85	0	0	2,85	0%
Other grains	185.680	59.197	3,14	12.720	4.055	3,35	7%
Rice	558.360	120.142	4,65	386.667	83.199	7,87	69%
Potato	4.472.650	135.937	32,90	183.982	5.592	34,26	4%
Dry Legumes	1.205.234	887.924	1,36	547.366	403.257	1,97	45%
Sunflower	1.933.635	734.465	2,63	2.747.417	1.043.569	6,37	142%
Rape	123.375	37.846	3,26	4.031	1.237	3,37	3%
Cotton (seed)	1.511.160	518.634	2,91	1.525	523	2,92	0,10%
Soy	138.880	32.848	4,23	2.411.582	570.389	77,64	1736%
Cotton Fiber					398.936		

	Import (tons)	**Yield (kg / hectare)**	**Required area to cover the import (hectares)**
Cotton fibre	750.000	1.880	398.936

Source: *It has been calculated based on the data from the Cotton Industry Report 2019 of TURKSTAT and National Cotton Council (UPK, 2019) .*

Considering the population growth rate and the risk of decreasing productivity due to increasing temperatures because of global climate change, the following actions gain importance in increasing production and production planning (ensuring food security) with the aim of reducing the import need.

1. Increasing productivity

2. Bringing fallow lands into production with alternating use

3. Conservation of agricultural land

4. Bringing land unfit for agriculture into agriculture

5. Ensuring import assurance through bilateral agreements with foreign countries (by mentioning the products that we are competitive in agricultural products)

6. Purchase or lease of agricultural land in foreign countries

In the fruit and vegetable sector, as in other crop production, the production scale is low and the use of technology is not at the desired level in the international arena. The small scale of the production areas causes the product range to be limited in foreign markets. Uncontrolled

use of drugs and fertilizers also negatively affects the industry. There are also deficiencies in the infrastructure of packaging facilities. There are also deficiencies in issues such as pre-cooling, sorting machines, cold air facilities and packaging technologies. It is necessary to focus on R&D activities in order to tend towards the production of high value added products. Seed breeding studies are also critical for the industry (TOB, 2016).

Organization

In the European Union, where cooperatives have an important place in the economic field, the market share of agricultural cooperatives reaches 40% (Bijman, 2016). In countries such as Scandinavian countries (Denmark, Finland, Sweden), Ireland, the Netherlands and France, this rate is over 50%. When the current situation of the cooperatives in Turkey is examined, it is possible to say that the number of cooperatives and their members is developing but not sufficient to the extent desired. Cooperative participation rates in some countries in the European Union, where cooperatives have an important place, are as follows: Ireland 70%, Finland 60%, Austria 58%. In Turkey, this rate is around 10% (TOBI, 2019b).

Animal Production

The small size of stockbreeder enterprises is similar to agricultural enterprises in terms of scale. 59.6% of the stockbreeder enterprises have less than 50 cattles. 63.9% of the sheep and goat breeding enterprises have 150 and more, 36.3% have 300 and more sheep and goats (TURKSTAT, 2016). Low yields in agricultural products is also seen in milk yields. Even though EU average in carcass meat yield has been reached from 2000 to 2016, milk yield is less than half of EU average (Table 12).

Table 28: *Meat and Milk Yield (Comparison of Turkey and EU)*

Average Carcass Meat and Milk Amount per Animal (kg)			
		2000	2016
Turkey	**Meat**	169	280
	Milk	1.654	**3.090**
EU-28	**Meat**	257	290
	Milk	5.321	**6.702**

Source: *Semerci Arif, (2016).*

Among the factors that adversely affect milk yield, breed improvement's being incomplete and modern breeding techniques' not being widespread, as well as the low fertility rate (offspring yield rate) are seen as important factors. The high rate of "calf mortality" also negatively affects the profitability and total milk production of cattle enterprises and causes the need for calf imports in the country.

According to the 2016 data, although the "rate of fertility" is around 90% in Europe, the rate of calves born per cow milked in the culture breed cattle of TR5-West Anatolia region is 78.60%, while Turkey is significantly behind the Europe average, with an average of 64.8% (Tüzmen, 2018). While the calf loss rates are 2.47-7.42% in England (2013) and 6.4% in the USA (2007), they are high in Turkey with the range of 10-15% (KOP, 2017).

In addition, it is known that the main issue preventing the sale of dairy products to the EU (EU's justification) is the high number of somatic cells in raw milk produced in Turkey. The number of enterprises that can produce raw milk at EU standards is limited. Modernization of dairy farms is important for both lowering unit costs and access to alternative markets by providing high quality raw milk production, and creating market diversity in the dairy sector.

Box 2: *Agricultural Production*

Small size of enterprises, insufficient use of technology, insufficient knowledge of farmers and livestock breeders, continuation of traditional and habitual wrong production methods (wrong irrigation methods, excessive use of fertilizers and pesticides, wrong feeding methods, not benefiting from veterinary services), avoiding to try new applications came to the fore in the Focus Group Meetings as the main obstacles in solving problems.
It was emphasized that the competitiveness of the enterprises is high compared to Europe and the world thanks to the knowledge and technology in poultry, fishery and aquaculture production.
It was stated that it would be beneficial to disseminate high value-added production areas and technologies such as organic agriculture, good agricultural practices, cultivation of medicinal and aromatic plants, and vertical agriculture.
In most of these and similar areas, there are successful case studies conducted or supported by Provincial Directorates of Agriculture, universities and Development Agencies, but they need to be disseminated.

c. Harvest, Transport, Storage

According to Turkey country report (2013) of the FAO on Food Loss and Waste, when the agriculture-food supply chain is considered as a whole, the highest loss rate is seen in "agricultural production". Structural problems faced by Turkish agriculture, such as small and fragmented farms and poor levels of cooperation, are the main causes of losses in the country.

Losses in the agricultural production phase are mainly related to the traditional methods employed by farmers. Losses are often due to farmers' reluctance to obtain knowledge. In addition, agricultural production is generally carried out by elderly people due to the youth's desire to migrate from rural to urban and work in different sectors. Older farmers are very slow to adapt to new technologies. Intermediate personnel shortage in agriculture can be listed as another reason for food losses at this stage of production. For example, there is a lack of labor for herd management and fruit pruning and vaccination in livestock.

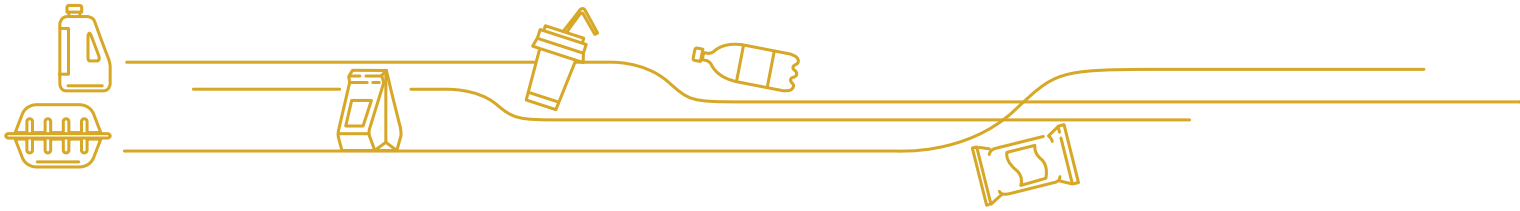
Another main factor is low rainfall and dry farming in large agricultural lands. Investments towards the widespread use of irrigated agriculture and more efficient use of irrigation water will reduce losses, especially in cereals.

The losses occurring in other stages are relatively lower than the losses in the production stage in agriculture. Recent developments in transportation, processing and storage technologies and new technology preferences of companies in the supply chain help to reduce losses.

Table 29: *Turkey's Food Loss and Waste Rate*

Turkey Food Loss and Waste Rate						
	Total	**Agricultural Production**	**Post-Harvest Transport and Storage**	**Processing and Packaging**	**Distribution**	**Home Consumption**
Cereals	17%	5,10%	4%	2%	1%	5%
Root and tubers	20%	7%	6%	2%	3%	2%
Oil Seeds and Pulses	32%	15%	5%	7%	1%	4%
Fruits and vegetables	53%	20%	8%	10%	10%	5%
Meat	17%	10%	0,20%	5%	0,50%	1%
Fish and aquaculture	12%	10%	0,02%	0,04%	0,01%	2%
Milk	20%	10%	1%	1,50%	6%	1,50%
Egg	10%	6%	1%	2%	1%	0,01%

Source: *Food Losses and Waste In Turkey Country Report, 2013, FAO*



In regions where the cold chain is not established in the transportation of milk, its negative effect on the quality and price of the milk constitutes another problem at the transportation stage. This negatively affects the income of both the milk producers and the dairy producers.

d. Food Processing

The food industry in Turkey is constantly changing and developing. Recently, the fluctuations in the supply of food raw material resources due to natural, social and economic reasons and the price changes largely due to this have made it necessary to use the existing raw material resources more efficiently and effectively, and the change in domestic and foreign demand has forced the food industry to be more innovative and use advanced technologies. These reasons have led the food industry to also consider food safety, environmental awareness, food trade and competitiveness of food businesses. Behavioral changes that increase sensitivity and awareness to developments in various sub-sectors have been observed, and the sensitivity of the industry has been enhanced with social responsibility projects (TKB, 2018).

According to the analyses made with the survey study, it has been observed that the technologies of the companies operating in the food industry and their efficiency studies in production are not at an advanced level. It can be said that they are relatively better in packaging technologies, but there are gaps that can be improved. Enterprise Resource Planning software has also not become widespread. It is understood that most of the companies carry out their Quality Control activities systematically and this has a positive effect on branding. However, there are a significant number of companies that need improvement in this area. After the pandemic, the importance of access to safe food has increased, so product traceability systems, where companies are weak, appear as an area that needs improvement.

While the product variety of companies is close to a high level, it is observed that they have difficulties in accessing the market (sales and marketing), market diversity cannot be created, distribution channels are not effective and digital marketing activities are not widespread. Most of the companies that do not export are micro and small-scale companies, it is seen that these companies need support to increase their export competencies.

The weakest side of the companies is evaluated as inadequacy and lack of systematic R&D and innovation activities. Low ability of employment of qualified personnel and to retain in the business, limited information sources by customers, suppliers and fairs, low level of publication follow-up, training activities and cooperation with universities also stand as important obstacles to the improvement of this situation. Due to the low course of R&D and innovation activities, companies cannot differentiate in products and / or services, and as a result, they tend to price-oriented competition. The fact that the companies focus on price-oriented competition but their productivity studies are low shows that there is not enough awareness in the enterprises on this issue.

The companies in TR21 Region, which participated in the survey, are also found to have similar problems. However, it was observed that they are in a better state regarding branding and on the contrary, they cannot show the same performance in export.

According to the outputs of the Turkey's Food Innovation Platform workshop, which was held under the leadership of TUBITAK-MAM Food Institute with the participation of 66 institutions and 145 stakeholders across the country, among the main problems in the food sector, despite the significant potential of natural and functional foods and traditional and local products, the inadequacy of converting them into value-added products, packaging, branding, food safety and traceability have come to the fore. The inadequacy of accredited laboratories and internationally accepted analysis in the industry is one of the obstacles in overcoming these problems. There are inadequacies in the country in terms of compliance with directives and standards, which are predicted to be stricter in the scope of food safety, health and traceability. In addition, preparations for data analytics, digitization applications and advanced technology usage, which are seen to be increasingly important in the world, are not sufficient. In food components including seeds and raw materials, foreign dependency in production aids, absence of biodegradable and compost-featured materials in packaging are the areas that need to be improved in the industry. There are also weaknesses in food waste and waste recycling in the country. The need for education

and especially qualified staff in some regions is seen as an important problem. Global warming, desertification and related problems threaten the industry. There are also weaknesses in cooperation with interdisciplinary studies, universities and research institutions within the framework of global new approaches that will contribute to the solution of the problems of the industry (TUGIP, 2021).

In addition to these, informal production and production out of regulation throughout Turkey continues for years as threats to fair competition and public health in the industry. Difficulties in accessing finance have been observed as one of the biggest problems threatening SMEs. This is mostly due to limited domestic financing resources, high financing costs and short maturities. However, financial support mechanisms for domestic investment, export and R&D activities can contribute to the financing needs of companies.

As stated in the 11th Development Plan, Report of the Special Expertise Commission on Competitive Production in Agriculture and Food, when the innovation performances of food and beverage enterprises in the world and in Turkey are examined, it is seen that Turkish enterprises make less innovation compared to the enterprises of EU countries. Especially in this respect, it is stated that the low R&D expenditures and insufficient use of technology, and the low competitiveness of the industry are among the main problems faced by the food industry. The results of the survey overlap with this inference.

It is important that academia and/or research centers contribute to R&D projects that will create added value and that have a high commercialization potential. Involving various non-governmental organizations in this process is required. In order to facilitate the cooperation of these structures with the industry, the participation and willingness to meet the R&D requirement of the industry's leading organizations, industrial organizations and interface organizations are mandatory.

Although there has been progress in the food industry in terms of technological innovation, considering the existing potential, it may develop further. In the process of supplying raw materials, especially in parallel with the developments in the field of biotechnology, the development of agricultural raw materials with the characteristics required by the food industry through improvement studies is important for the development of the Turkish food industry. In terms of transportation/shipping, technological improvements in transportation and storage conditions will benefit the development of the food industry in the delivery of both raw materials and processed end products to the consumer. Sensor technologies that will provide instant tracking of logistics control, storage and transportation conditions based on global positioning systems (GPS) are the research areas needed in this field (TKB, 2018).

In addition, the financial support mechanisms and programs for R&D in the country contribute to the development of R&D awareness and activities in the industry. While R&D expenditures in Food Industry Manufacturing were realized as 115 million TL in 2015, it increased regularly to 320 million TL in 2019. Its share (1.1%) among the total R&D expenditure in all industries remained unchanged. Full Time Equivalent R&D Manpower increased from 66 thousand in 2015 to 115 thousand in 2019. As of June 2019, the number of R&D centers operating in the food and beverage industry has increased to 53 (TSB, 2019) .

The number of Food Technologies Patent/Utility Model applications increased from 17,530 in 2000 to 35,069 in 2010, after this year it accelerated further and reached 83,890 in 2015 and 99,163 in 2018 (Patentgrowth, 2020).

e. Distribution/Marketing/Sales

Distribution channels in Turkey has a two-sided structure, including classical and modern. At every stage of the channels, there are on the one hand, a large number of small and classic members, and on the other hand, few but constantly evolving modern members. However, the rate of small members is around 90%. The most complex and long distribution channels are found among foodstuffs. There are many organizations, especially at the wholesaler level. In the retail layer, there are thousands of small-scale sellers specialized in individual products and services, supermarkets, grocery stores, butchers, grocery stores, cooperative stores and semi-wholesaler semi-retail stores (Kıvrak, 2014). The use of digital marketing tools (website, e-commerce platforms, social media) has increased significantly in recent years and especially after the COVID-19 pandemic.

6.2.2. Food Industry PESTLE Analysis of TR21 Region

The analysis made to provide inputs in identifying opportunities and threats for short, medium and long term strategies to be established by evaluating the effects of macro developments on political, economic, sociocultural, technological, legal and environmental scales in the remote environment of the enterprises on the food sector in the TR21 Region is shared in the table below.

Table 30: *Food Industry PESTLE Analysis of TR21 Region*

Factors	
Political	• Failure to maintain continuity in agricultural policies • That raw material producer countries do not want to sell products by developing protective policies, especially in times of crisis • That EU develops obstacles, which renders purchasing difficult to protect its own producers • Considering agriculture among priority sectors, efforts to develop new policies • Reflection of the problems in foreign relations on trade (e.g. Russia and Iraq)
Economic	• That sudden changes in foreign currency render planning difficult, and its increase raises costs • Increase in stocking and increase in raw material and food prices in times of crisis • Limited resource of qualified workforce • Uncertainties in raw material supply (fluctuations in supply and prices, inability to make predictions) • Availability of financial support for agricultural production • Availability of financial support for investment, export, R&D expenses (incentives, grants) • Participation of immigrants in the labor market • Increased overall demand and demand for value added products due to increases in Income level
Social	• That farming is not considered to be a prestigious profession • Continuing rural-to-urban migration • Decline in young people's interest in the agricultural sector • Changing consumer habits, emerging new needs • That gender equality is at a good level in the region compared to the average of Turkey • The high capacity of the young population to participate in the workforce • New product demands with the increase of health awareness
Technological	• Development of the applications Agriculture 4.0, Food 4.0 • That industry is developed in the region • The competence of universities in the Agri-Food industry • That the infrastructure for R&D studies is ready in the public institutions and universities • That small-scale agricultural businesses are not keeping up with technology • Easy access to productivity enhancement technologies
Legal	• Widespread informal and out of regulation production • That the process of adaptation to EU legislation is not completed • That legislation supporting Investment, Production, R&D, Export is established • That Intellectual Property Rights legislation is in force
Environmental	• Inefficient use of water resources • That the industry threatens water resources and the environment • Pollution and degradation of agricultural land, erosion • Waste utilization investments' not becoming widespread • Lack of environmental awareness, not being ready to comply with Green-Deal conditions • The potential of successful practices in waste management to be a model

6.2.3. Food Industry SWOT Analysis of TR21 Region

The strengths and weaknesses of the TR21 Region and the main issues creating Opportunities and Threats for the region in line with the data obtained from secondary sources and the information obtained during the focus group meetings are presented in the table below.

Table 31: *Food Industry SWOT Analysis of TR21 Region*

Strengths	Weaknesses
• The high capacity of agricultural production • That the land is fertile, that there is high yield thanks to the efficient use of climate and mechanization • That modern stock farming is widespread • That Thrace is rendered as a region free from illnesses • Specialization in rice, milk and oil • Being on Europe border gate and passageway • Being close to metropolises, foremost being İstanbul • Being among the regions least affected by climate change • Having a developed industry	• The low level of fruit-vegetable production • That the export level is low compared to the capacity of the region • That market diversity has not been formed • Concentration on pricewise competition, the insufficiency of R&D/ Innovation studies • The low level of productive activities in companies • That University-Industry cooperation has not been developed and information resources are insufficient • That the data infrastructure needed for planning is weak • The low education level of agricultural producer, the continuance of misapplications based on habits • Weaknesses in qualified personnel employment
Opportunities	**Threats**
• Proximity to major markets (Europe, İstanbul and metropolisest) • Availability of the region for organic and good farming practices • Growing Chinese market • Increasing demand for some products with the change of consumer habits (healthy, local, functional, packaged products with long shelf life, etc.) (fruits and vegetables, fish and aquaculture products for domestic consumption, probiotic products, organic products) • That there is a university and Agricultural Research Institution in the region • The widespread use of e-commerce infrastructure and ease of application • Availability of financial support (incentives, grants) for R&D, export operations and Investments • Possibility of applying new technological developments (Agriculture 4.0, Food 4.0) • Applicability of modern irrigation systems	• That wild watering causes erosion and soil degradation • That overwatering consumes water resources • Deterioration of soil structure due to the excessive use of pesticides and manure • That the industry consumes groundwater resources and causes environmental pollution • That the sudden changes and increases in exchange rate complicate planning and increase costs • The reflections of countries' tough, protectionist policies, problems experienced in external affairs on trade

6.2.4. Food Industry Five Forces Analysis of TR21 Region

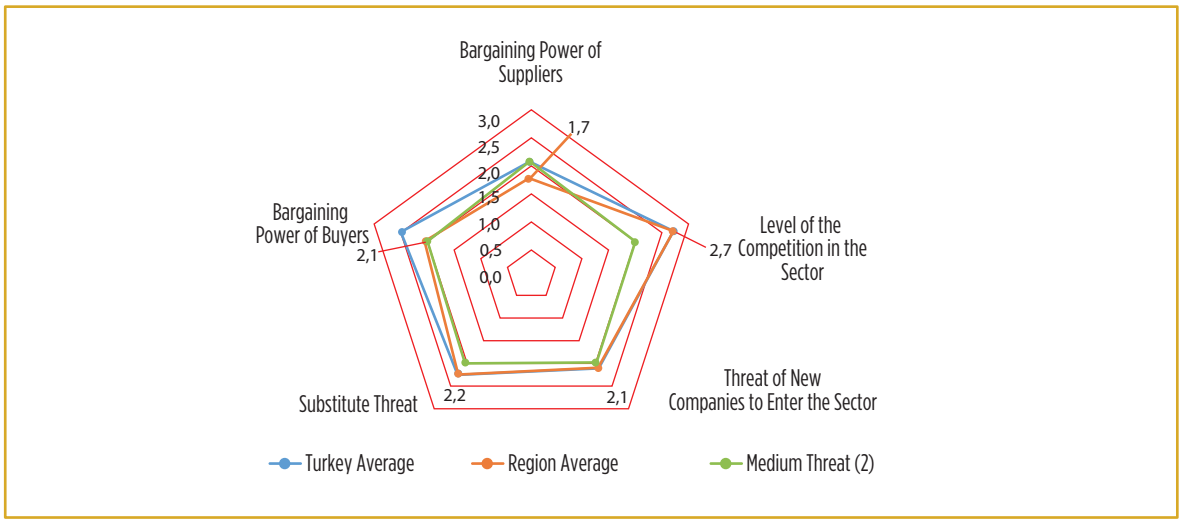


Figure 28: *Food Industry Porter's 5 Force Analysis of Turkey and TR21 Region*

Threat of New Companies to Enter the Industry

Capital-intensive and knowledge-intensive industries are more difficult to enter. The threat of a new company's entering the market in the region was perceived slightly above the middle. The industry is perceived by most companies with a moderate intensity. However, no concentration was observed according to the sector or company size. It is understood that it varies according to the product type.

Threat of Substitute Products

In the comparison made with the price and quality characteristics of the substitute products, the threat posed by the prices of the substitute products was perceived as being close to high. The threat of the quality-benefit characteristics of substitute products has been evaluated as below the middle.

Bargaining Power of Buyers

In the case of the bargaining power threat of buyers, it is seen that the number of buyers does not pose a threat to companies. However, the price-oriented preference of buyers is perceived as high and very high by many companies.

Bargaining Power of Suppliers

Supplier threat in the region is also perceived as low. The desired quality raw material can be accessed at the requested time. The presence of supplier diversity also increases the bargaining power of companies.

Intensity of intra-industry competition

The intensity of intra-sector competition tends to increase with the increase in the number of producers (excess supply) and the decrease in the number of buyers (low demand). It is seen that competition in the sector is fierce. In this regard, in addition to the strong effect of excess capacity in the sectors, it was observed that price-oriented competition was intense.

As determined in the value chain analysis, the firms' low productivity activities contradict the buyers' price-oriented preferences. It is thought that efficiency studies should be increased and priority should be given to energy studies and energy efficiency studies in capital-intensive enterprises in order to reduce costs. It is seen that the competitiveness of the companies is price-oriented,

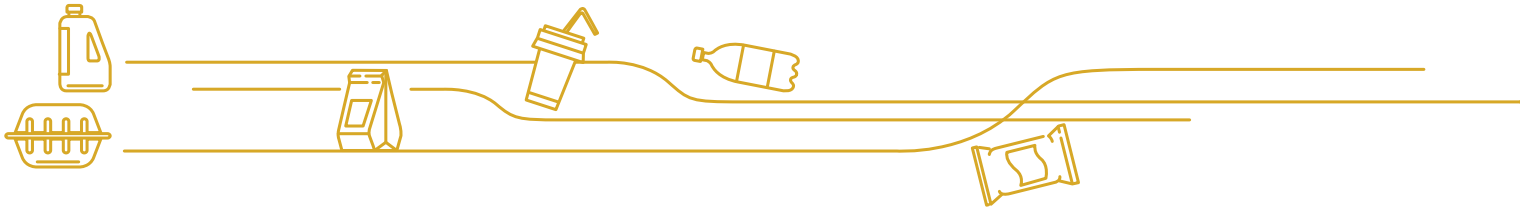
market diversity cannot be created and exports are low. The low level of R&D and innovation activities, the difficulty of accessing qualified personnel, and keeping them in the business cause inability to create differentiated products, and their weak competencies in access to the market and export cause the inability to create market diversity. These conditions intensify competition within the sector. It is thought that companies should enrich their information resources, focus on R&D and innovation activities in collaboration with universities, and focus on differentiated product development, market diversification and export activities.

6.2.5. TR21 Region Food Sector Gap Analysis

In the light of the results of the analysis conducted with the survey specific to the TR21 Region, information obtained from secondary sources and data obtained as a result of focus group meetings, the operational and technological deficiencies/risks that occur at different stages of the food industry value chain are evaluated and shared in the table below in order to guide the strategies to be developed.

Table 32: *Food Industry Gap Analysis of TR21 Region*

Logistics/Distribution
• The absence of smart logistics centers that bring together manufacturers, intermediaries, consumers, and logistics providers in a digital environment and increase speed and efficiency • The lack of a central collection and distribution plan to reduce the product losses of the harvest and distribution and for the delivery of food to the needy, which have become difficult in COVID-19 and similar crises
Production/Technology
• That productivity studies are not widespread • That the use of digital technologies such as Enterprise Resource Planning (ERP) is not widespread • Insufficiencies in production technologies • That the product tracking system does not become widespread • The use of improper production techniques based on habits in agricultural production, carrying the soil to dams with excessive irrigation, transferring of fertilizer and pesticide residues to the dam. • That modern pressurized irrigation techniques such as drip irrigation, which support the efficient use of water resources, are not common
Marketing/Sales
• Lack of organization and cooperation between agricultural producers • That agricultural producers sticking to the traditional supply chain • The lack of market diversity in food industry companies, low exports • Inadequacy of micro and small companies in export • The low level of promotional activities that will support the awareness and branding of the companies, the ineffectiveness of the distribution channels • Failure to sufficiently take advantage of the opportunities brought by electronic commerce, that websites and social media are rather used for promotional purposes
Supply
• High dependence on imports in agricultural inputs (diesel, fertilizers, pesticides, vaccines). Increasing costs due to the increase in foreign exchange rates and obligation to reduce production caused by the restriction of border trade especially in times of crisis • Being dependent on imports in production raw materials
Human Resources
• Low education level of agricultural producers • Risks in finding human resources to continue production (youth not being interested in agricultural production, rural to urban migration) • Risk of a seasonal labor bottleneck • Insufficient vocational training mechanisms for agricultural production • The scarcity of qualified human resources for food processing facilities • Low ability of companies to retain qualified workforce • Small number of vocational education institutions and insufficiencies in industrial implementation



Finance
• Producers working with low capital, risk of not being able to continue production due to cash shortage • Increase in production costs due to the volatility in foreign exchange, costs' not being reflected or being reflected late on prices, exchange rate risk • Limited financial resources available to companies • High financing cost
R&D and Innovation
• Underdeveloped University-Industry cooperation • Low R&D and innovation expenditures in SMEs • Low level of R&D and innovation activities and failure to conduct them systematically • Insufficient number of qualified personnel to carry out R&D and innovation activities • Underdeveloped R&D and innovation-oriented collaborations • That companies' knowledge resources are limited and access to knowledge is limited to customers, suppliers, and fair visits

7. Horizontal Subjects

7.1. Crisis Management

Cross-border animal and plant pests and diseases, food security and radiation incidents have increased in recent years, affecting people's access to quality food and putting their livelihoods and health at risk. To meet this challenge, FAO (Food and Agriculture Organization) has established the Food Chain Crisis Management Framework (FCC).

The FCC is FAO's action tool that supports countries in the global management of threats to the human food chain at all stages from production to consumption. Two Committees at FAO, the Policy Advisory Committee and the Oversight Committee, have a governance role for these threats and crises. The FCC includes adequate threat supervision, early warning, preventive and risk reduction practices, better preparedness and response, and the adoption of appropriate policies.

The FCC consists of three areas of action that comprehensively address the entire cycle of a food chain crisis: "coordination and intelligence", "prevention and early warning", "intervention" (FAO, 2016).

It will be useful to construct a similar structure in Turkey. Panic, difficulties in the supply of labor, disruption of the supply chain, restriction of food exports due to the harsh protective policies of countries especially during the COVID-19 pandemic increased the risks in food security. It would be appropriate to establish a Crisis Management Committee within a public unit that will ensure coordination among the relevant stakeholders.

It is thought that if Agri-Food City Councils are established in provinces, they will be effective in ensuring coordination. With the establishment of Food Banks in the region where fruit and vegetable production is intense, products that are difficult to sell in times of crisis, when the harvest is abundant and/or exports are restricted, can be prevented from deteriorating and delivered to fragile and disadvantaged groups. The Smart/Digital Logistics Center proposed in the Focus Group Meeting will also contribute to ensuring effective planning and distribution.

7.2. Resource Efficiency

Underground water is rapidly being used up in the world, and biodiversity is seriously damaged. As countries turn to alternative bioenergy sources and fossil fuels, competition for resources required for energy and food use increases. The demands of agriculture, industry and cities competing with each other cause water scarcity.

In order to adequately feed the growing population, resource-intensive food is needed, however, agricultural production must increase significantly due to the increase in demand for agricultural raw materials and bioenergy. At the same time, land and water resources are also under pressure, unsustainable agricultural practices and other human activities endanger biodiversity and ecosystems in general. With the effect of population growth, the amount of agricultural land per capita has decreased rapidly (Figure 29).

It is not possible for high-input, resource-intensive farming systems to provide sustainable agricultural production, which are held responsible for the reduction of forests, the depletion of soil and water resources, the loss of biodiversity and the high amount of greenhouse gas emissions. Therefore, innovative systems are needed to protect and improve natural resources while increasing productivity.

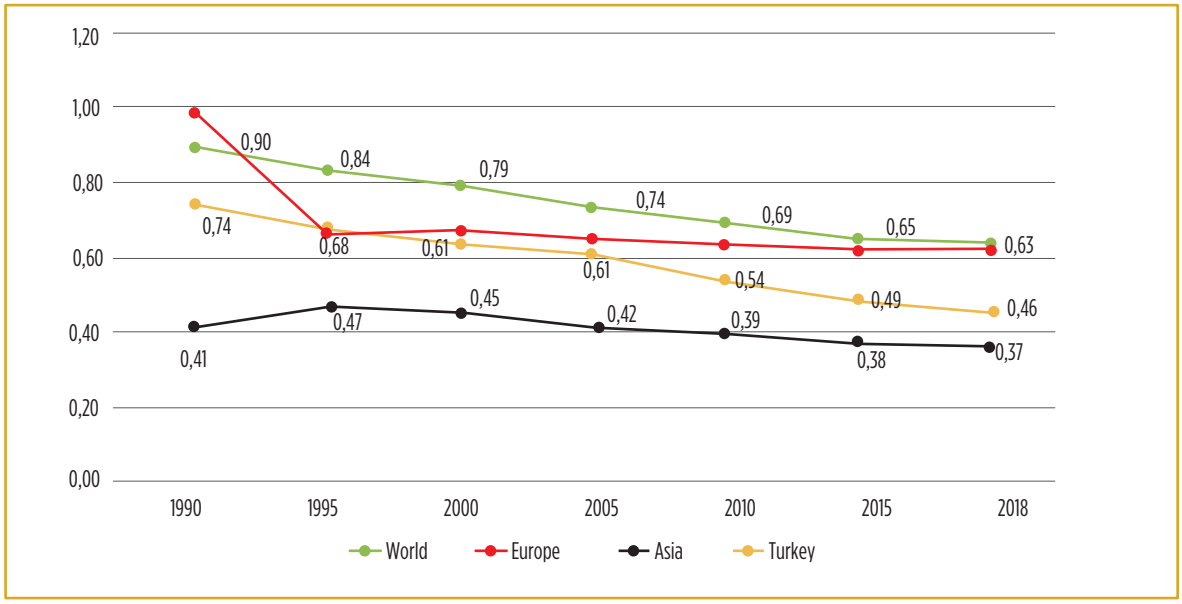


Figure 29: *Farmlands Amount Per Capita (hectares) - World, Europe, Asia and Turkey*

Source: *http://www.fao.org/faostat/en/#data/RL (Calculated based on FAO Farmland and Population Information data)*

The optimum use of natural resources, raw materials and products and their reuse after recovery can be achieved with circular economy methods. The circular economy takes into account the use of all resources in a way that adds the most value to the economy and causes the least harm to the environment. The aim of a circular economy is to use natural resources longer and to prevent waste and environmental pollution as much as possible.

In a circular economy, natural resources must first be used and managed effectively. Such resources include soil, water and biodiversity as well as minerals. These resources are crucial for generating renewable resources. Secondly, the optimum use of food is important. Reducing food waste is an important starting point in this context, such as less processed foods or a diet with more vegetable protein and less animal protein. Less use of natural resources and less environmental pressure are also important. Finally, it is important to make optimum use of residues such as tomato stems, beet pulp and stale bread. This way, as little biomass as possible will be lost (PBL, 2017).

Dairy industry has developed in TR21 Region. Although there is a whey processing plant, which is the waste of dairy enterprises in the region, it remains idle. Considering that the facilities in other provinces of the country work efficiently, it is important to identify and solve the problems of the facility in the region and to operationalize it. In this way, it will be possible both to reduce environmental pollution and to increase added value.

7.3. Climate Change

In recent years, the frequency and intensity of extreme weather events such as heat waves, droughts, forest fires, floods, hurricanes and cyclones have been increasing globally. The increase in average temperatures has reached significant points and July 2019 has been recorded as the hottest month of the last century globally. In the last report of the Intergovernmental Panel on Climate Change (IPCC), it is predicted that the temperature increases will be around 2.5-3°C in 2050, and that the increases will reach 6°C by the end of the century (TUSIAD, 2020).

Food and Agricultural Industries increase the greenhouse gas emissions significantly. Climate change will affect food production, food security and nutrition. Increasing variability in precipitation, droughts and floods cause a decrease in crop yield. Apart from food supply, climate change also affects the stability of food quality, access and utilization, and food security. Agricultural practices that increase food production through less "greenhouse gas-intensive" ways should be introduced.

Small farms' adoption of sustainable agriculture, water, fisheries and forestry management is critical for adaptation to climate change, eradication of global poverty and ending hunger (FAO, 2017).

When examining how the climate in Turkey affected the crop pattern in cereals between 1991 and 2015, it is observed that the prolongation of sunshine in wheat production regions due to climate change has a restricting effect on wheat cultivation areas and has a shifting effect to other crops. It has been observed that the decrease in the amount of rainfall narrows the corn cultivation areas, while the increase in temperature has the effect of restriction the barley cultivation areas, while the increase in humidity has an effect on the expansion of the sunflower area. It is predicted that these effects will gradually increase at the regional level under the effect of climate change. As a result, price risks that yield variability will increase may cause pattern shifts.

Studies at the crop level have predicted that the production amount will decrease by 8% in wheat, 2% in barley, 9% in corn and 13% in sunflower due to the yield decreases caused by the climate effects.

Turkey is also exposed to significant risks through export restrictions that may be imposed by countries such as Russia, Ukraine and Kazakhstan, which are its important trade partners in wheat. It is estimated that these policy risks will increase even more with the effect of climate change, as seen between 2007 and 2011 (TUSIAD, 2020).

In the local effects of climate change report (TEMA, 2015), the impacts of climate change in the Marmara Region were stated as follows: Decrease in snowfall, and as a result, decrease in ground and surface water levels, drinking water problems; Decrease in living and plant species, decrease in biological diversity of forest areas, extinction of endemic species; Low productivity in agriculture and stock farming; Decrease in yield, especially in chestnuts, peaches, figs, and cherries, which are indigenous products; Decrease in fisheries and damage to tourism, the proliferation of jellyfish; Observation of seasonal shifts, trees shedding their leaves early, and observation of irregular rainfalls.

In the "Impact of Climate Change on Water Resources" project conducted by the Ministry of Agriculture and Forestry (TOB) covering the years 2015-2100, it is stated that all simulations point to significant warming in the country at seasonal and annual scales in the relevant period. It is predicted that the greatest temperature increases will occur in the inner and eastern parts, namely in Van, Fırat-Dicle, Seyhan, Ceyhan, and Konya Closed Basins, and the lowest temperature increases will occur in Ergene, Marmara, North Aegean, and the Black Sea Basins.

In the second period of the modeled scenario, i.e. between the years 2040-2069, it is predicted that the crop growing season precipitation will decrease almost everywhere except a part of the Marmara Region or will not change much compared to 1971-2000. Similarly, in the period of 2070-2099, there is a small increase in precipitation in the Marmara Region compared to the reference period (1971-2000), while other regions of Turkey have similar signs of decrease. It is estimated that there will be significant reductions in snow-covered areas and the amount of snowfall throughout Turkey. (TGDF, 2017).

7.4. Gender Equality

Turkey is ranked among the lowest countries in terms of gender inequality worldwide. Turkey ranked 130th out of 153 countries in the World Economic Forum's 2020 Global Gender Inequality Index. In the index, Turkey ranked 136th in the category of women's participation in the economy and equal opportunity, 135th in participation in the labor force, 106th in equal pay for equal work, 13th in access to education opportunities, 64th in health and 109th in representation in political life (BBC, 2021).

Gender inequalities in the Turkish agricultural industry is in the form of unequal access to real estate, property, animal husbandry, agricultural equipment, entrepreneurial opportunities and financial resources, to the detriment of women. The prevailing production model is largely based on unpaid family labor, seasonal and often immigrant labor. Women take up the majority of agricultural labor but do not usually appear in national statistics. The unregistered nature of their employment means they miss out on critical social benefits, such as receiving a pension.

Since the 1980s and 1990s, the gradual loss of agriculture as an economic activity that generates income has mainly affected women negatively. The high prevalence of informality in agricultural employment, combined with the invisibility of women's labor in the industry, causes women to not benefit equally from a production process to which they contribute greatly.

In addition, there are significant disparities between rural and urban areas in terms of women's access to education, healthcare and decent employment in non-agricultural sectors (FAO, 2016).

In the survey on the Food Industry throughout Turkey, it is seen that the gender balance is against women, but the difference is not very high[18] (Figure 30).

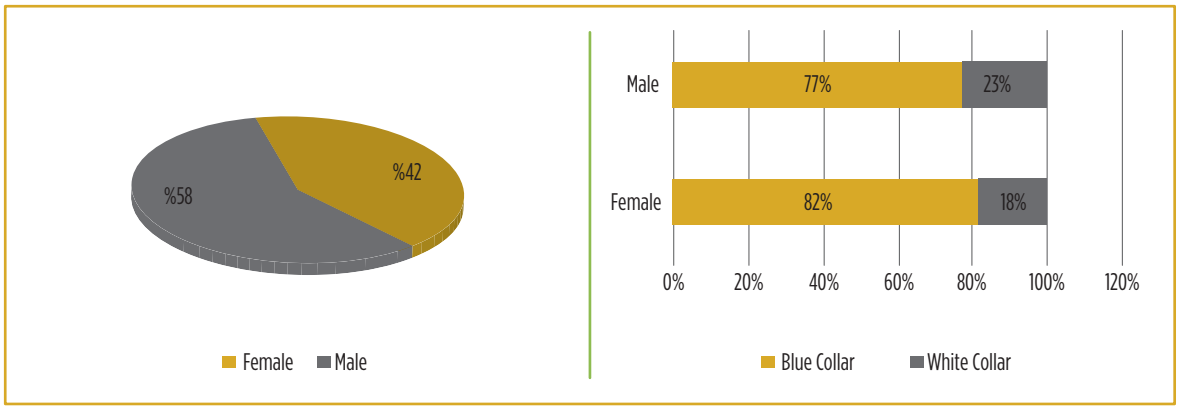


Figure 30: *Turkey's Food Industry - Distribution of Employees by Gender and Collar Colors (Survey Results)*

Inequality is also seen in jobs defined according to collar color. While 22.8% of male employees work in "white-collar" jobs, this rate is 18.3% for women (Figure 30). Women constitute 36% of those working in "white collar" jobs, and 43% of those working in "blue collar" jobs (Figure 31). This shows that there is a tendency for women to be employed in lower paid jobs.

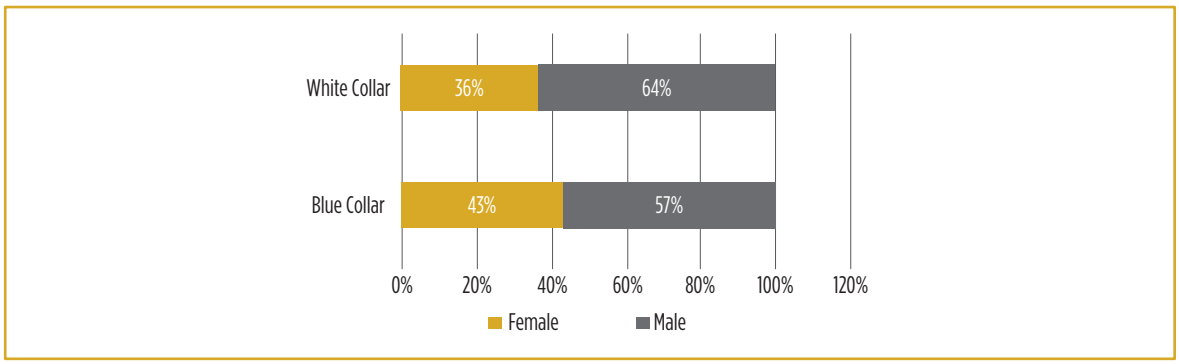


Figure 31: *Turkey's Food Industry - Gender Distribution of Employees by Collar Colors (Survey Results)*

According to the Gender Equality Index scores in Gender Equality Scorecard for 81 Cities (2019) report (TEPAV, 2019), TR21 Region provinces, foremost being Kırklareli, perform successfully with a higher score than Turkey average (Table 33). Likewise, Edirne and Kırklareli performed well above Turkey's average according to the "Participation in Production Activities Sub-Index". In this parameter, Tekirdağ is slightly below the average of Turkey.

18- Number of female employees: 2,180 (42%), number of male employees: 3,063 (58%)

Table 33: *Gender Equality Index in Turkey and TR21 Provinces*

	Gender Equality Scorecard		Participation in Production Activities Sub-Index
2019	Index	Turkey Ranking	Indeks
Turkey Average	0,471		0,477
Tekirdağ	0,504	17	0,474
Edirne	0,510	12	0,534
Kırklareli	0,527	5	0,571

Source: *TEPAV, (2019)*

In 2014, the ratio of the working female population to the total working population in the TR21 Region was 30% lower than that of men. According to the data of 2019, the ratio increased to 31% and there was a slight increase in favor of women. The rate of female employees in agriculture and industry has decreased from 2014 to 2019, and a high level of a tendency towards the service sector has been observed. There is no significant inequality in the ratio of female and male employees on a sectoral basis (Figure 32).

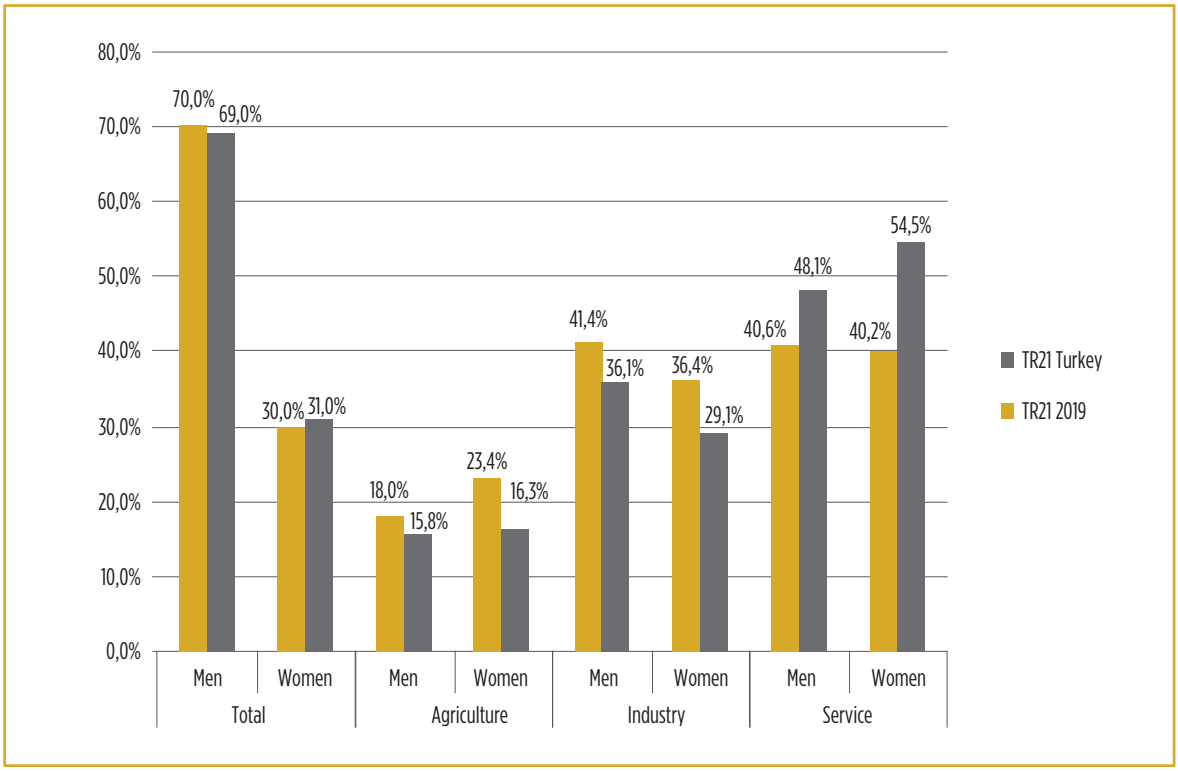


Figure 32: *Distribution of Employees in TR21 Region by Gender and Economic Activities*

Source: *TURKSTAT, Economic activity branches of those employed by year and gender (Level 2)*

According to the data of 2019, the rate of working women in the TR21 Region is slightly behind the average of Turkey. When evaluated according to economic activities, the rate of women working in the industry in the region is significantly higher than the average of Turkey. The rate of women working in the agriculture and service sectors is lower than the average in Turkey (Figure 33).

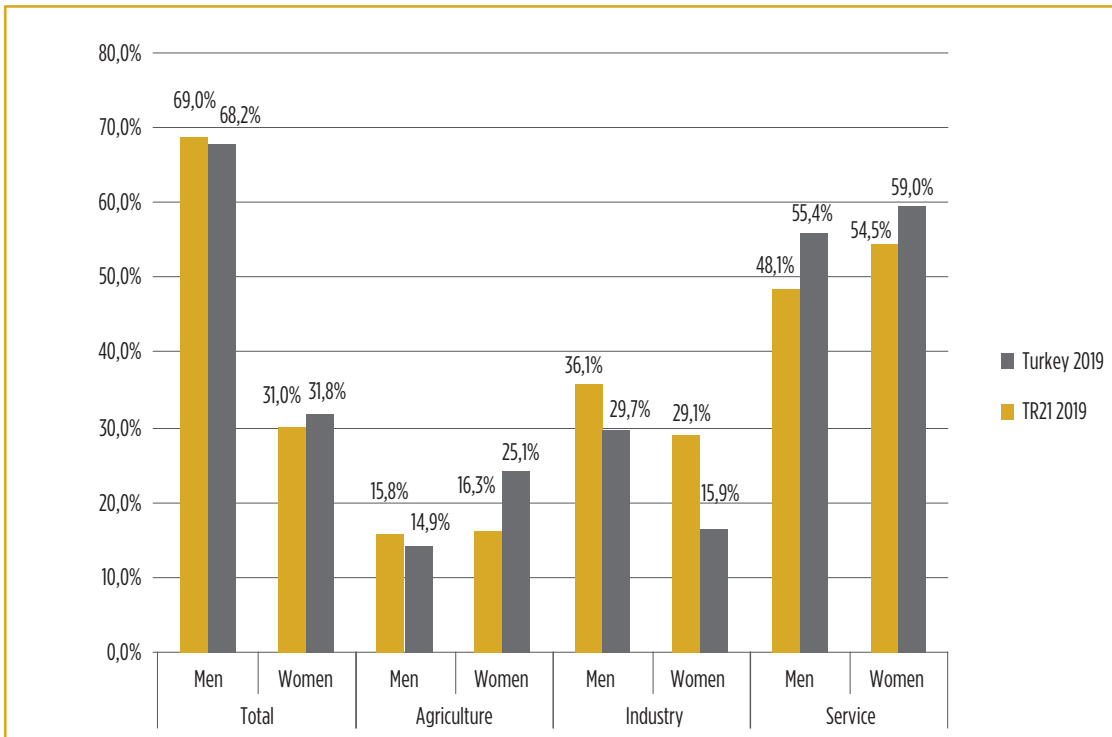
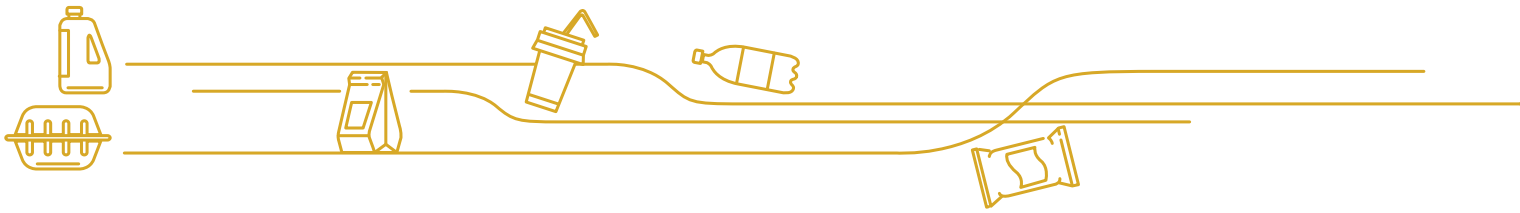


Figure 33: *Distribution Comparison of Employees in Turkey and TR21 Region by Gender and Economic Activities*
Source: *TURKSTAT, Economic activity branches of those employed by year and gender (Level 2)*

8. Policy Recommendations

Infrastructure	
Policy Recommendation	**Implementation Time**
Designing agricultural production and planning in the food industry in line with the objectives of increasing the efficiency of investments and supply.	Medium Term (1-3 Years)
Designing programs that will increase added value through the adaptation of knowledge-based technologies and methods to food value chain processes	Medium Term (1-3 Years)
Designing physical infrastructure, managerial processes and organizations in order to create designs and plans based on accurate and up-to-date data	Medium Term (1-3 Years)
Making plans and developing international collaborations, considering the self-sufficieny criteria in strategic products in agricultural production.	Medium Term (1-3 Years)
Designing financial support mechanisms in line with the objectives of increasing efficiency, added value and cooperation, and ensuring social welfare and environmental protection	Medium Term (1-3 Years)
Establishing national and international collaborations to approach COVID-19 and similar crises with a holistic perspective, ensuring accessibility to information to prevent panic	Medium Term (1-3 Years)
Designing plans and programs to increase access to international markets and increase international competitiveness	Medium Term (1-3 Years)
Intensifying branding efforts in the TR21 Region	Long Term (3-10 Years)
Increasing the efficiency and quality management competencies of companies in the TR21 Region	Long Term (3-10 Years)
Increasing the R&D and innovation competencies of companies in the TR21 Region and developing collaborations within this scope	Long Term (3-10 Years)
Increasing the competence of companies in the TR21 Region to access foreign markets and cooperation in this context	Long Term (3-10 Years)
Designing collaborations to ensure the continuity of information flow in the value chain, to create synergy and to achieve economies of scale	Long Term (3-10 Years)
Integrating digital technology applications in value chain components (production, logistics, food processing, distribution, marketing/sales, test/analysis)	Long Term (3-10 Years)



Human Resources and Capacity Development	
Policy Recommendation	**Implementation Time**
Designing undergraduate and graduate formal education and vocational education programs in a practice-weighted manner and in line with industrial expectations, experiencing practices in real cases	Medium Term (1-3 Years)
Establishing programs to support women and people with disabilities who have limited access to economic activities due to the socio-economic structure	Medium Term (1-3 Years)
Establishing programs for migrants to participate in the agricultural labor market and to ensure their livelihoods and to eliminate the labor bottleneck	Medium Term (1-3 Years)
Establishing pilot implementation examples to increase the knowledge and skills of agricultural producers, developing models that will encourage producers to prefer new methods	Long Term (3-10 Years)
Ensuring that Blue-collar and White-collar employees stay up-to-date by creating infrastructures to access new developments in production methods, technology and management	Long Term (3-10 Years)
Developing cooperation between educational institutions and the private sector in order to determine and meet the human resource needs and qualifications of the sector, and modernizing educational institutions with up-to-date technologies	Long Term (3-10 Years)

Natural Resources and Community Welfare	
Policy Recommendation	**Implementation Time**
Taking measures for efficient use and saving of water resources	Medium Term (1-3 Years)
Preventing damage to the environment by cleaning waste water resources	Medium Term (1-3 Years)
Prevention of incorrect practices that cause soil degradation in agricultural production	Long Term (3-10 Years)
Increasing the added value by bringing industrial and agricultural waste to the economy and preventing the damage they cause to the environment	Long Term (3-10 Years)
Ensuring the sustainability of agri-food activities by preventing the factors that cause the degradation of ecology	Long Term (3-10 Years)
Increasing food supply by reducing food losses in the value chain, reducing carbon emissions	Long Term (3-10 Years)
Ensuring the protection of public health by establishing mechanisms to provide food safety	Long Term (3-10 Years)
Ensuring sustainability by meeting human resource needs in agricultural production through promoting rural life	Long Term (3-10 Years)
Developing financial mechanisms to adapt to global climate change	Long Term (3-10 Years)

9. Short, Medium and Long Term Strategies

Although the crisis stemming from the COVID-19 pandemic has produced unique problems and changes in the agri-food industry, it has also caused many ongoing problems in the industry to come to light and become more severe. The importance of sustainability in agri-food products has become more evident for the most basic needs of the society, which are nutritional requirement and protection of health. Short, medium and long term strategies have been developed in National and Regional scope in order to find solutions to the problems identified in the analyses and tried to be expressed throughout the report. The concept of sustainability has been taken into account while developing strategies.

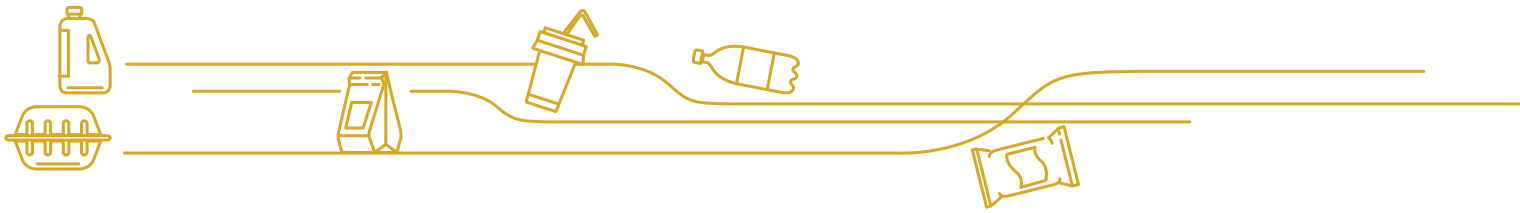
Sustainable Food Value Chain according to FAO:

It is defined as the consecutive coordinated value-added activities of all farms and companies that provide wide benefits to society, do not consume resources permanently, and the farms' production of agricultural products, transforming these products to food products by the companies to sell them to final consumers and then dispose them. Beyond commercial and financial viability, the sustainability element of the sustainable value chain includes the transition to institutional mechanisms that lead to a more equitable distribution of increased added value and less use and impact on non-renewable resources. The three sustainability aspects (economic, social, environmental) are closely interrelated: social and environmental sustainability become determinants of market access and competitiveness (FAO, 2014).

Strategies considered in the context of sustainability are designed under three aspects as "Strategies within the Economical Scope", "Strategies within the Social Scope" and "Strategies within the Environmental Scope". Within the economical scope, the focus is on the means of participation in the value chain (access to the market, access to training, coordination and cooperation building, access to finance) (Stark&Damper, 2012) and activities that create value in the agricultural value chain (Başer&Bozoğlu, 2018) (increasing quality, increasing system efficiency, differentiated product development). Strategies for pandemic crisis management are designed by considering the analysis results, expert opinions and FAO's response recommendations (FAO, 2020d).

9.1. Strategies within the Economical Scope

	Description	Explanation	Implementation Time (Year)
Strategy E.1:	**Providing central planning and coordination**		
Sub-strategy E.1.1	Establishment of National and City Agriculture-Food Councils	It aims to systematize and accelerate communication between the multi-structured industrial stakeholders (public-university-private sector-local government-non-governmental organizations) and to develop policies and strategies for planning, management and crisis management by eliminating information asymmetry	Medium Term (1-3 Years)
Sub-strategy E.1.2	Establishment of the Planning Scientific Board	It requires an interdisciplinary study as it includes dynamic and multi-variables such as agricultural planning, agricultural land resources and characteristics, climate and water needs of products, water resources, population, population growth, number of tourists, productivity increase, consumer habits, region-based cost, usage areas (food, feed, biomass), international competition, bilateral agreements, policies, and disaster scenarios such as climate change, periodic drought, flood, etc. It should be aimed at developing strategies and planning by considering the scenario outputs prepared with mathematical models.	Medium Term (1-3 Years)



Sub-strategy E.1.3	Planning Crisis Management	It aims to support long-term production and logistics planning to reduce the effects of problems that endanger the country's food safety and security, such as drought, animal diseases, disruption in the supply chain in crisis periods such as pandemic, low harvest, heavy protective measures of countries. It will be ensured that the crisis strategy plan is formed and negotiations with international stakeholders are made.	Medium Term (1-3 Years)
Sub-strategy E.1.4	Establishing data access infrastructure	It aims to increase predictability by providing access to up-to-date and accurate information for all stakeholders (public institutions, local governments, universities, private sector, producers, etc.), and to increase the efficiency and effectiveness of strategies and plans with the opportunity of data-based measurement and evaluation.	Long Term (3-10 Years)

Strategy E.2:	**Supporting cooperations**		
Sub-strategy E.2.1	Capacity building in cooperatives	Although the number of cooperatives is high across the country, their activities in the market are generally limited. It aims to increase the efficiency of the cooperatives in the market, to achieve economies of scale, to prevent the information asymmetry for effective planning, to ensure the more effective participation of the cooperatives in the value chain	Long Term (3-10 Years)
Sub-strategy E.2.2	Dissemination of contracted planting/ production practice	It aims to provide contracted planting / production supports in order to eliminate price and harvest uncertainties in the market and to make effective planning	Long Term (3-10 Years)
Sub-strategy E.2.3	Developing and supporting clusters	It will support the creation of synergy and the flow of information between stakeholders by preparing a cooperation environment between the stakeholders of the industry.	Long Term (3-10 Years)

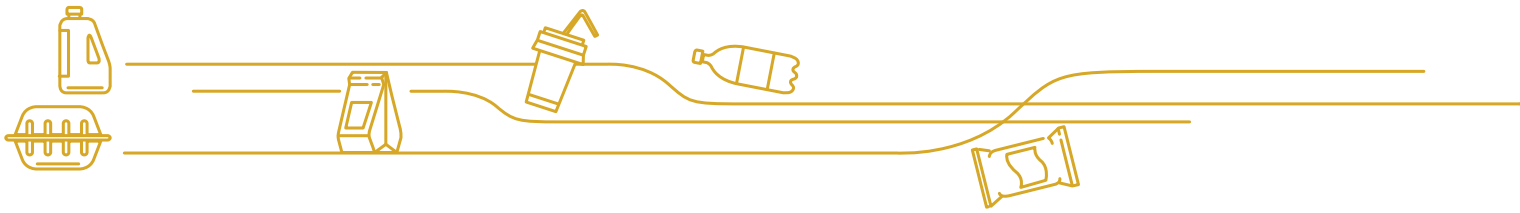
Strategy E.3:	**Increasing productivity**		
Sub-strategy E.3.1	Increasing Productivity in Agricultural Enterprises	The fact that the yield in agricultural production in many products lags behind developed countries is an important factor of high costs. With the increase in productivity, it will be ensured that the income of the producer and the amount of production will increase, therefore, food security will be provided and production costs will be competitive in international markets.	Long Term (3-10 Years)
Sub-strategy E.3.2	Increasing Productivity in Animal Husbandry Businesses	It will be ensured that the activities to increase the productivity of enterprises that are not productive compared to developed countries due to reasons such as small scale structure, low productivity breed, insufficient veterinary services, plant design not suitable for animal welfare, and economic sustainability of dairy cattle breeding and stockfarming will be ensured	Long Term (3-10 Years)
Sub-strategy E.3.3	Increasing Productivity in Food Production Businesses	It aims to bring in capacity increases and new technological infrastructures that will increase efficiency to companies and to develop support mechanisms	Long Term (3-10 Years)

Strategy E.4:	Increasing the added value		
Sub-strategy E.4.1	Developing Network Structures	Developing networks that contribute to the flow of information with National and international stakeholders in order to access up-to-date information and find partners in R&D activities	Medium Term (1-3 Years)
Sub-strategy E.4.2	Supporting (focused) R&D activities	Efficient use of financial resources will be ensured by transferring financial resources to the development of promising value-added products and technologies.	Long Term (3-10 Years)
Sub-strategy E.4.3	Supporting investments that will increase added value	It aims to support logistics, production and service infrastructure investments that will increase the added value of the product.	Long Term (3-10 Years)

Strategy E.5:	Providing access to the market		
Sub-strategy E.5.1	Supporting Infrastructures	By supporting mechanisms and infrastructure for access to domestic and international markets, it will be ensured that more shares are taken from the new distribution channels of companies and markets where the potential cannot be used.	Long Term (3-10 Years)
Sub-strategy E.5.2	Training and Consultancy Activities	SMEs in the country generally focus on production activities and price-based competition. It aims to support training and consultancy activities to increase human competencies in business model, marketing and export issues, which are important in the business plan, and to support the necessary mechanisms and infrastructures to provide them.	Long Term (3-10 Years)

Strategy E.6:	Skill and Capacity Building		
Sub-strategy E.6.1	Development of Vocational Education Infrastructure	It aims to support the structural change and the development of new mechanisms to solve the problem of qualified intermediate staff that has been going on for years in the country.	Long Term (3-10 Years)
Sub-strategy E.6.2	Development of Professional Education System	Adapting applied education to the structure of formal education in line with the needs of the industry. It aims to support the infrastructure that will enable the personnel working in the enterprises to access up-to-date information after formal education	Medium Term (1-3 Years)

Strategy E.7:	Ensuring access to financial resources		
Sub-strategy E.7.1	Improving financial support systems	It aims to renew the subsidies in agricultural products in a way to support international competition and productivity.	Medium Term (1-3 Years)



9.2. Strategies within the Social Scope

	Description	Explanation	Implementation Time (Year)
Strategy S.1:	**Increasing the level of social life in the countryside**		
Sub-strategy S.1.1	Increasing the attractiveness of rural life	It aims to try to eliminate the reasons for migration of the rural population as the decrease in the number of people engaged in agricultural activities as a result of migration from rural to urban, the fact that young people do not show interest in this sector, and the increase in the average age of the producer may cause interruption of production in the future	Long Term (3-10 Years)

Strategy S.2:	**Strengthening the Food Safety and Security System**		
Sub-strategy S.2.1	Making improvements in legislation	It aims to prevent practices that threaten public health that do not comply with hygiene rules and to eliminate the lack of knowledge on this issue.	Medium Term (1-3 Years)
Sub-strategy S.2.2	Consumer Awareness Activities	It aims to control and prevent imitation and fraud practices that threaten the public health and cause unfair competition between companies.	Medium Term (1-3 Years)

Strategy S.3	**Ensuring social equality**		
Sub-strategy S.3.1	Establishing financial support mechanisms	It aims to provide financial support to those who have limited access to economic activities due to the socio-economic structure in the country.	Long Term (3-10 Years)

9.3. Strategies within the Environmental Scope

	Description	Explanation	Implementation Time (Year)
Strategy Ç.1:	**Su Sourcelarının verimli kullanımının sağlanması**		
Sub-strategy Ç.1.1	Improving the agricultural water infrastructure	74% of the water resources in the country are used in agricultural irrigation, and the loss rate in agricultural irrigation is approximately 51%. Efficient use of water resources will be ensured by changing transportation methods and using modern irrigation methods.	Long Term (3-10 Years)
Sub-strategy Ç.1.2	Improving Natural Water Resources, Industry, City Water Infrastructure and increasing reserves	As in agricultural irrigation, loss rates in urban water transport are also high. Water resource efficiency will be increased by reducing losses. Damage to the environment will be prevented by treating waste water. Water reserves will be increased by accumulating dispersed water resources. The protection of biodiversity will be ensured by preventing the pollution of water resources such as lakes etc.	Long Term (3-10 Years)

Strategy Ç.2:	**Ensuring the recycling of waste**		
Sub-strategy Ç.2.1	Bringing industrial and agricultural waste to the economy	Many industrial and agricultural wastes cannot be recycled and damage the environment due to management difficulties, although it has economic value. With the utilization of wastes in economic activities, their damage to the environment will be prevented and added value will be increased.	Long Term (3-10 Years)

Strategy Ç.3:	Adapting to climate change		
Sub-strategy Ç.3.1	Supporting energy saving applications	Carbon emissions will decrease and costs will be reduced by reducing energy consumption.	Long Term (3-10 Years)
Sub-strategy Ç.3.2	Supporting climate change adaptation activities	It aims to provide financial support to be used in financing of technologies developed for adaptation to climate change and measures to be taken.	Long Term (3-10 Years)

Strategy Ç.4:	Reducing food losses		
Sub-strategy Ç.4.1	Improving storage/ transport systems	A significant amount of losses occur during and after the harvest of agricultural products. By reducing losses, the supply will be increased, thus carbon emission will be reduced and product unit costs will be reduced.	Long Term (3-10 Years)
Sub-strategy Ç.4.2	Utilization of disused products	It aims to bring the products that cannot be evaluated on time in sales and consumption places in a center and bring them in the economy.	Long Term (3-10 Years)
Sub-strategy Ç.4.3	Protecting ecology	The practices that harm the ecology and endanger biodiversity and sustainability will be prevented.	Short Term (0-1 Year)

10. Industrial Action Plan and Draft Budget

The recommended national and regional activities (actions) to be implemented under the headings of the strategies are given in the tables below. In the explanations, the actions at national scale were taken into consideration first. Many national-scale programs have the opportunity to be implemented in cooperation with regional stakeholders or independent from the central structuring in the region. These are specified regionally in the explanations and are colored in blue. Priority programs for the region are specified in blue characters. Explanations regarding actions that can be carried out in parallel or independently with national programs at the regional level are colored in blue. Globally important actions are indicated with green characters.

The sustainability of Agri-Food products may be directly or indirectly related to the problems that occurred or became apparent in the COVID-19 crisis. The relationship between the actions that are thought to have a direct effect on these problems has been tried to be explained and colored with green. Explanations to avoid repetition are not included in every action, as different actions can serve similar purposes.

Actions are planned as short, medium and long term. In budgeting, the national scale was taken into consideration and classified as follows:

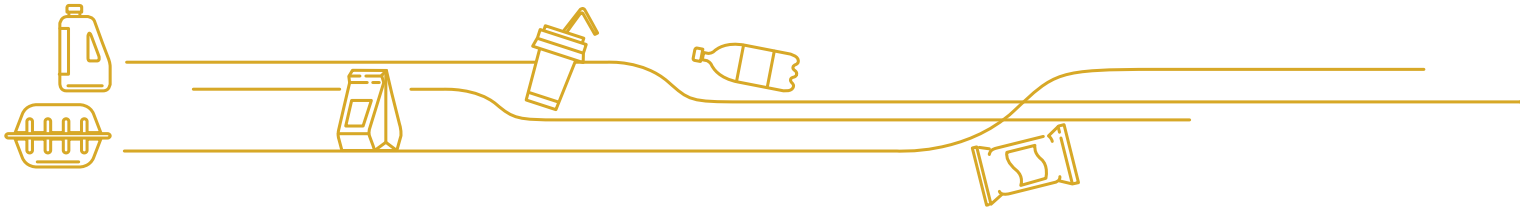
Nano Investment : 0 – 10 Million TL
Micro Investment : 10 – 100 Million TL
Meso Investment : 100 Million – 1 Billion TL
Macro Investment : 1 – 10 Billion TL
Mega Investment : Over 10 Billion TL

10.1. Actions within the Economical Scope

		Explanation	Esti-mated Budget	Imple-men-tation Time (Year)
Strategy E.1:	**Providing central planning and coordination**			
Sub-strategy E.1.1	**Establishment of National and Urban Agriculture-Food Councils**			
Action E.1.1.1	Examining successful best practices in the world, determining stakeholders, setting up legislation and structure	Establishment of central (national) and city agri-food councils consisting of representatives of public institutions-universities-private sector-local governments-non-governmental organizations in order to systematize the simultaneous meetings of all sector stakeholders by examining country models with successful practices such as Canada. Designing a localized structure in accordance with Turkey's conditions in which the model will be in communication and cooperation with the provinces of the National Council. (Purpose: Proposing policies, strategies and projects regarding the links in the Agricultural-Food value chain (procurement, production/production planning, human resources, export, logistics, distribution, investment, R&D etc.) **Regional:** (In the absence of a national initiative, regional studies can be carried out) Establishment of City Agri-Food Councils at provincial level that bring together sector stakeholders (exporters, wholesalers, retailers, producers, universities, local administrations, logistics providers). In COVID-19 and similar crises, it will be possible to increase the effectiveness and speed of the measures by accelerating the communication and ensuring cooperation between the stakeholders in the value chain.	Nano Invest-ment (<10 Million TL)	Short Term (0-1 Year)

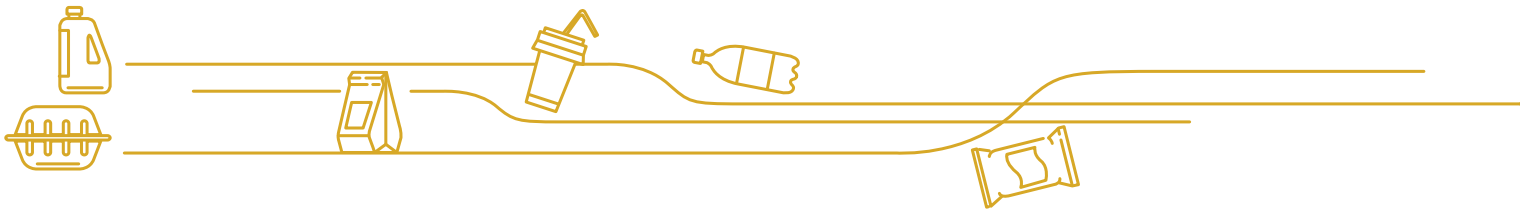
Sub-strategy E.1.2	Establishment of the Planning Scientific Board			
Action E.1.2.1	Determination of Planning Scientific Committee Stakeholders, preparation of roadmap and legislation	Determining the stakeholders of universities-public/private sectors and confirming the structure and members of the board. Simulating regular periodic, annual and long-term plans with academic studies and designing final planning proposals Decreasing fallow lands by designing "Alternate planting program" and decreasing the period in which the lands remain empty, ensuring that cultivated agricultural lands and crop supply are increased. **Regional:** It should be considered as a unit within the City Agri-Food Council. In times of COVID-19 and similar crises, it will be able to contribute to the provision of food security, especially in products based on imports	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

Sub-strategy E.1.3	Planning Crisis Management			
Action E.1.3.1	Establishment of the Central Agriculture-Food Crisis Committee	Examining the crisis models such as FAO's Food Chain Crisis Management Framework and designing a model suitable for the conditions of the country. Determining stakeholders of universities-public/private sectors and establishing a committee, preparing the Strategic Crisis Plan and monitoring it periodically. **Regional**: It should be considered as central and local units within the relevant public institutions. The Crisis Committee, which will design the crisis plan, will also be appropriate in the City Agri-Food Councils. It will contribute to preventing panic and ensuring food security during COVID-19 and similar crisis periods	Nano Investment (<10 Million TL)	Short Term (0-1 Year)
Action E.1.3.2	Ensuring the continuity of the workforce	Establishing a human resources data bank to ensure that labor supply is not interrupted in times when labor is important, such as harvesting and pruning, financial support for those working in areas that require urgency in times of crisis, and designing a program for determining accommodation for employees **Regional**: It can be considered among the activities of the crisis committee (Crisis Committee within City Councils in case of failure to form a central structure) It will ensure that critical human resource supply can be provided in pandemics such as COVID-19.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)



Action E.1.3.3	Organization of logistics centers and distribution	Access to food has become difficult due to quarantine during pandemic period. Determination of the places where food products will be stored in times of crisis, development of the project in which the distribution tools, human resources and distribution plan will be determined. (Neighborhood bazaars and food banks, which are addressed in the Market Access strategies and planned to be developed with local governments, can be evaluated within the scope of this project) **Regional**: It can be considered among the activities of the crisis committee (Crisis Committee within City Councils in case of failure to form a central structure) During the quarantine period in pandemics such as COVID-19, the risk of contamination and access to food will be reduced by ensuring their distribution to homes	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.1.3.4	Planning the supply of inputs and products and marketing and export of products for crisis periods	During crisis periods, inputs dependent on imports of raw materials and problems in the supply of products jeopardized production and food security. Likewise, the difficulties in exporting caused some products not to be utilized. The change in consumption places and the decrease in the number of tourists have especially damaged the meat, milk and fishery industries. A project should be developed for procurement, distribution and evaluation planning in a possible similar outbreak. (In case of establishment of the Planning Scientific Board, it can be carried out within this unit) **Regional**: It can be carried out in cooperation with the Local Governments, City Council and the Crisis Committee. It will contribute to preventing disruption of production and reducing food losses in pandemics such as COVID-19 etc.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.1.3.5	Developing international collaborations	Negotiations with international stakeholders in crisis periods, primarily on bordering neighbors and countries where food trade is concentrated, in line with national policies and strategies on bilateral trade and logistics. **Regional**: It should be considered among the activities of the City Agri-Food Council In the COVID-19 pandemic, the importance of international collaborations in providing food security has become evident. The supply risk and speculations of countries, which are caused by overprotective measures in crises, can be reduced	Micro Investment (<100 Million TL)	Medium Term (1-3 Years)

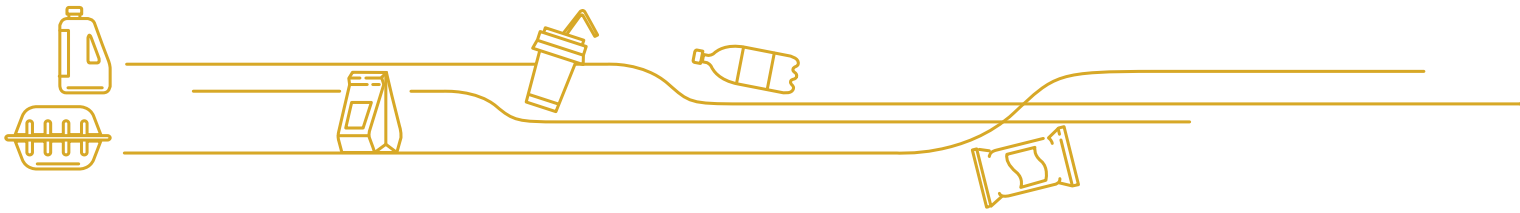
Sub-strategy E.1.4	Establishing data access infrastructure			
Action E.1.4.1	Registration and monitoring of agricultural enterprises through a single tax record	Making business registration a necessity without additional financial burden in order to ensure that the inputs and outputs of agricultural enterprises are followed up like other economic enterprises, dissemination of the TIKAS (Agricultural Enterprise Registration System) project run by the T.R. Ministry of Agriculture and Forestry	Micro Investment (> 10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.1.4.2	Establishment of the Agri-Food Information platform	Collecting the data needed by the producers and buyers, such as supply, demand, stock, logistics (warehouse, transportation vehicle), meteorological information, on a digital platform, where the prices of agricultural products can be tracked daily. **Regional**: In the absence of a national action, regional studies can be carried out Agricultural producers and businesses will be able to access information and make planning. It will also contribute to the prevention of information pollution and panic in crises such as COVID-19	Micro Investment (> 10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.1.4.3.	Establishing the Food Traceability System	Establishment of a digital information system/ platform (Food Traceability System) required for crisis management mechanisms such as recall by monitoring products and processes retrospectively to identify the source of the problem by monitoring products and processes backwards to ensure Food Safety. (Carrying out infrastructure studies, supporting companies) **Regional**: In the absence of a national initiative, a regional pilot study can be conducted In crises such as COVID-19 where hygiene and health are at the forefront, it will contribute to meeting the public's need for information about products	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.1.4.4.	Establishment of the Consumer Information Platform	Developing a digital platform where the prices of basic food products can be seen simultaneously in local and national chain markets and making it obligatory for chain markets to enter data on this platform. It will be possible to prevent information asymmetry between consumer and seller and to monitor cartel behavior (determination of common price) in chain markets.	Micro Investment (> 10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.1.4.5.	Establishment of the Program Monitoring and Impact Assessment System	Ensuring efficiency analyzes by systematically monitoring the effects of strategies and actions implemented in agri-food policies, and increasing the effectiveness of plans and implementations by revising them in line with the outputs (National strategies, focused programs, the outputs of the farmers' training and subsequent applications, etc.)	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)



Strategy E.2:	Supporting cooperations			
Sub-strategy E.2.1	Capacity building in cooperatives			
Action E.2.1.1	Modeling successful cooperatives	Developing product-based (dairy products, fruit-vegetable, fishery, etc.) cooperative models by examining successful national and international cooperative examples (Ex: Tire Dairy Cooperative, Bademli Arboriculture Cooperative) **Regional**: It may be designed in dairy sectors with high production capacity The development of cooperatives will contribute to the reduction of supply and price uncertainties in food and the sustainability of agri-food products by ensuring the continuity of producers' earnings. It will be able to provide organized action in crises such as COVID-19.	Nano Invest-ment (<10 Million TL)	Medium Term (1-3 Years)
Action E.2.1.2	Implementation of designed cooperative models with a provincial pilot implementation program	Planning and supporting at least one pilot implementation for each province, considering the designed models that are suitable for the product pattern of the province **Regional**: First of all, the dairy sector, which has a high production capacity should be considered	Meso Invest-ment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.2.1.3	Providing support for the development of marketing infrastructure (physical, digital and human)	Using alternative distribution channels (e-commerce) for further participation in the value chain, standardization/quality management, marketing, branding infrastructure, training and providing financial support. Making use of EU financial support programs by designing projects in this regard. Supporting Producer Cooperatives that make contractual sales to retail stores. **Regional**: Studies can be carried out aimed at the cooperatives in the region.	Meso Invest-ment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.2.1.4	Developing a culture of collectivization	Cooperatives that use agricultural mechanization tools and warehouses jointly will be supported financially and their capital efficiency will be increased. **Regional**: Studies aimed at the cooperatives in the region.	Meso Invest-ment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy E.2.2	Dissemination of contracted planting/production practice			
Action E.2.2.1	Providing financial support to contracted planting producers, cooperatives and industrialists purchasing with contracted planting agreements	Providing additional financial support to cooperatives and producers who have contracted planting agreements with the producer Providing additional financial support to industrialists making contracted purchases from cooperatives (it is aimed to support contracted planting and cooperatives simultaneously) **Regional**: Studies aimed at the cooperatives and industrialists in the region. Supply-demand imbalances and price fluctuations will be prevented. It will contribute to sustainability in agri-food products by ensuring the continuity of the earnings of the producers.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.2.2.2	Distributing the products of the cooperatives to students and people in need through campaigns	Supporting the purchase of Milk through local governments and its distribution to students and/or families with low income. It aims to provide market assurance to the producers and healthy nutrition of the households. (It can be carried out in conjunction with Food Banks' activities) **Regional**: A milk campaign can be organized in the region	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

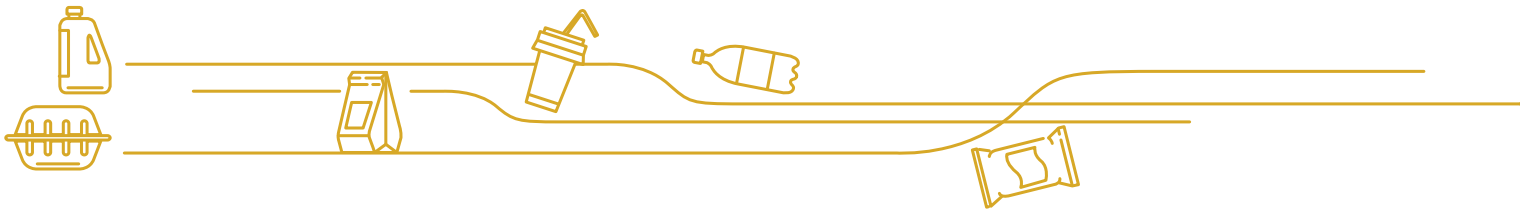
Sub-strategy E.2.3	Developing and supporting clusters			
Action E.2.3.1	Preparation of Strategic Industrial Plans in the sub-sectors of the Agriculture-Food Industry	Preparation of needs analysis and strategic plans to increase the share of industries (first of all, the "fruit ", "vegetable ", "various food products" industries with a falling share in the world market, and "poultry", "egg" industries that take place in the world market by creating low added value due to price-oriented competition, then "fishery and aquaculture", "cereals", "vegetable oil", "confectionery", "HS Code 20- processed fruit and vegetable") in the global value chain, primarily industries that are strategically important in employment, exports, added value, etc. **Regional**: Studies specific to the vegetable oil sector can be carried out in the region	Micro Investment (> 10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.2.3.2	Supporting clusters in strategic products	Leading the national clusters in line with National Strategic plans by the public institutions and/or national umbrella organizations. Carrying out branding studies of national products (Turkish Salmon, Turkish Crayfish, etc.) (Eurofish Cluster in EU can be considered as an example model) Establishment of Regional Food Clusters. Promotion studies of Ur-Ge (International Competition Development Program conducted by Ministry of Trade) projects (Collaborations should be based on the market pull principle. Ensuring that the public support for exporters/sellers to determine customer demands/ needs, the investments for this can be made by the producers, and that the R&D projects are carried out in cooperation with the universities) **Regional**: All sectors can be considered together under the umbrella of Vintage and Food Cluster.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)



Strategy E.3:	Increasing productivity			
Sub-strategy E.3.1	Increasing Productivity in Agricultural Enterprises			
Action E.3.1.1	Bringing water to currently non-irrigated, but economically irrigatable lands	Developing projects to bring water to the economically irrigatable lands where dry farming is carried out The importance of self-sufficiency in agricultural production has become more evident in the COVID-19 pandemic. With the increase in the amount of production, the rate of self-sufficiency will be increased.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action E.3.1.2	Establishment of income/ harvest insurance model	Even if the recommendations come from competent people, it is not possible for farmers to give up their usual production techniques, some of which are incorrect, such as excessive use of fertilizers, pesticides and water. However, they tend towards the practices experienced. Transition to modern agricultural techniques can be achieved by applying the income/harvest insurance model as an incentive tool to eliminate the effect of risk perceptions on the preferences of the producers to implement modern agricultural techniques (and not supporting those who do not apply modern agricultural techniques). With the increase in productivity and product quality, decrease in the use of fertilizers and pesticides will reduce costs, prevent the degradation of agricultural land, increase the production amount and contribute to sustainability.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)
Action E.3.1.3	Supporting the application of modern production techniques and automation technologies in greenhouses	Supporting cost reduction methods (production methods, automation technologies) in order to reach international markets at competitive prices **Regional**: The greenhouses in the region can be supported The increase in food prices during the COVID-19 crisis has made it difficult for the poor to access food. Decreasing costs in production may prevent excessive increase in prices.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)
Action E.3.1.4	Supporting vertical farming practices	Supporting new generation vertical farming greenhouse applications that save space and water **Regional**: It is thought that a new sector may be formed by using advanced technology for the region in which fruit-vegetable production is low. The decrease in agricultural land is one of the major obstacles in increasing production. The continuity and increase of production will be ensured with advanced technological applications, and it will be possible to support sustainability with low resource consumption.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)
Action E.3.1.5	Supporting greenhouse practices using renewable energy sources (geothermal, biomass, solar, wind)	Supporting greenhouses that use renewable energy sources to reduce energy costs by determining profitable renewable energy resources for the region and/or for irrigated agriculture where the electricity distribution network does not reach It will contribute to sustainability by ensuring resource efficiency.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Action E.3.1.6	Bringing fallow lands into production with alternating use	In case Planning Science Committee can not be established or is not involved in its activities; Decreasing fallow lands by designing *"Alternate planting program"* and decreasing the period in which the lands remain empty, ensuring that cultivated agricultural lands and crop supply are increased. **Regional**: Conducting a program on a provincial and regional basis will be appropriate in case a central/ national planning is not made Self-sufficiency rate can be increased by increasing the amount of production.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.1.7	Land consolidation activities	Creating lands that are large enough to use agricultural mechanization tools efficiently and have economies of scale by combining small pieces of land. By increasing productivity in production, it will be possible to reduce production costs and prices. By establishing a business structure that will provide the producers with a livelihood, the number of migration from rural to urban will be reduced and it will contribute to continuity in production.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy E.3.2	**Increasing Productivity in Animal Husbandry Businesses**			
Action E.3.2.1	Development and implementation of the "Calf Program"	Low "fertility" and high "calf mortality rate" decrease the milk yield and cause the income of the farms to decrease. They also cause the need for calf import. Systematic implementation and support of veterinary services aimed at increasing the "fertility" (calving rate) and decreasing the "calf mortality rates" within the scope of a program **Regional**: In case a national program is not developed, a regional study program can be developed in cooperation with the relevant institutions Increasing the number of calves will support the decrease in imports. With the increase in milk yield and the increase in calf incomes, the income of the enterprises will increase and the costs will decrease. It will contribute to the supply security of milk and meat products.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.2.2	Breed improvement studies suitable for the region	Supporting the dissemination of transition from low-yielding breeds that affect milk and meat yield to breeds suitable for the region **Regional**: In case a national program is not developed, a regional study program can be developed in cooperation with the relevant institutions. With the decrease in costs and the increase in the amount of production, the durability and supply assurance of the enterprises will be provided.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

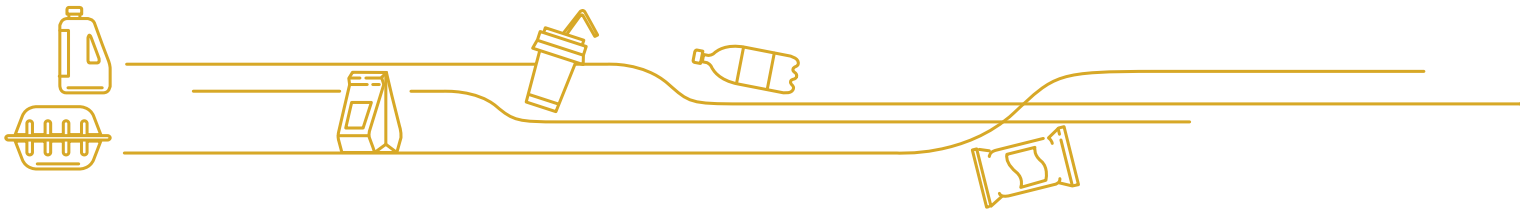


Action E.3.2.3	Reducing the cost of feed by increasing pasture livestock breeding with the improvement of pastures and infrastructure supports	Due to the lack of sufficient amount of roughage (green grass, etc.) throughout the country, grain and oilseed-based compound feeds are used more than ideal rates. This situation leads to low productivity and cost increase in meat and milk. Cost reduction and productivity increase can be achieved by supporting the development of pasture livestock. **Regional**: In case a national program is not developed, a regional study program can be developed in cooperation with the relevant institutions	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.2.4	Supporting modern, economical livestock enterprises in scale	Modernization of facilities that are not suitable for animal welfare and/or having high unit costs due to their small scale, and supporting capacity increases for the scale that the producer can live on with the income of the enterprise without the need for engaging in other activities (prioritizing in the existing Rural Development Supports and increasing the budget) **Regional**: In case a national program is not developed, a regional study program can be developed in cooperation with the relevant institutions	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.2.5	Dissemination of livestock OIZs	Supporting the dissemination of Animal Husbandry Specialized Organized Industrial Zones that increase productivity in production and take environmental risks under control (provided that designs that minimize disease transmission risks are taken into account)	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy E.3.3	**Increasing Productivity in Food Production Businesses**			
Action E.3.3.1	Supporting the capacity increase of small scale meat and milk processing plants	Supporting the capacity increases of the facilities with high costs due to their small scale (prioritizing the existing Rural Development Supports and increasing the budget) **Regional**: Support program can be designed for businesses in the region	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.3.2	Supporting Digital Technology infrastructure	Supporting Enterprise Resource Planning (ERP) software, in-house communication infrastructure, automation, Food 4.0 (Digital Transformation applications in the Food Industry) technology investments **Regional**: The use of Institutional Resource Planning programme is not widespread in the region. This software should be evaluated primarily since it is necessary for the infrastructure. Support program may be designed for the businesses in the region. With the dissemination of digital technologies, increase in the productivity of companies, traceability of food, and effective planning will be ensured and supply asurance and food security will be supported in processed food products by decreasing the cost of companies and increasing their durability.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Action E.3.3.3	Dissemination of food OIZs	Expanding Food Organized Industrial Zones will contribute to the increase in added value and productivity by making use of industrial symbiosis opportunities.	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.3.3.4	Providing industry-based incentives and supports	Planning incentives and supports to give priority to the industries with high added value. Removing facilities that process products with low capacity utilization rate and risky raw material supply from the support system. **Regional**: Grape Processing, Rice, Medicinal-Aromatic Plants, Organic Food sectors should be considered as priority.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.3.3.5	Giving priority/ privilege to cooperation in incentives and supports	Preparation of legislation/programs to provide additional support to cooperating businesses in order to increase the intensity of information flow in the value chain and to create synergy by increasing cooperation **Regional**: Revisions can be made in the support mechanisms applied for the regions By ensuring cooperation and flow of information in the value chain, the fluctuation in supply and prices will be reduced, and by providing food security, panic can be prevented in times of crisis.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

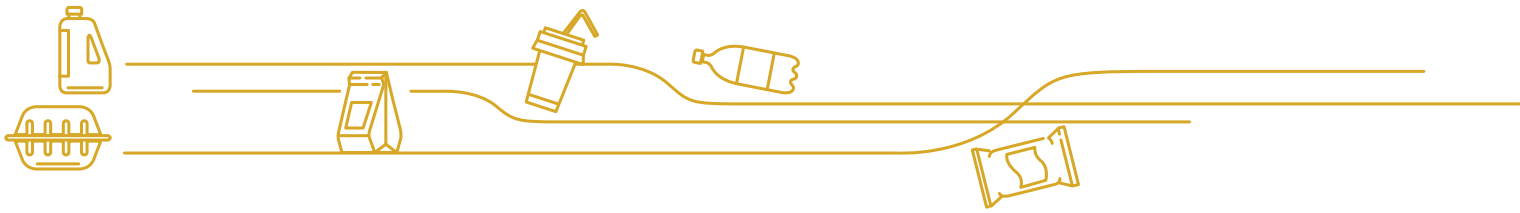
Strategy E.4:	**Increasing the added value**			
Sub-strategy E.4.1	**Developing Network Structures**			
Action E.4.1.1	Organizing activities for the development of university-industry cooperation	Development of programs such as idea days, technology days with the participation of Technology Transfer Offices, academicians of the relevant departments, private sector and entrepreneurs. (Developing projects where the first communication will be ensured by providing compulsory, voluntary or accidental encounters between producers/ industrialists and academicians. For example, providing laboratory services, organizing free training programs, making pilot facilities at universities available to the producers/industrialists) (TechAnkara Project Market of Ankara Development Agency can be taken as a model) **Regional**: Regional programs can be designed.It will be appropriate to provide laboratory services within the university and to conduct training/informational (e.g. Vertical Farming practices, Energy Efficiency practices etc.) meetings. Sustainability can be achieved by keeping companies up-to-date, solving problems, increasing efficiency and quality by preventing late access to advanced technologies by the industry.	Micro Investment (>10 Million TL & <100 Million TL)	Medium Term (1-3 Years)



Action E.4.1.2	Supporting international collaborations	Supporting memberships to international clusters and network structures, and participation in events **Regional**: Businesses in the region can be supported	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.4.1.3	Being a party to Entrepreneurship/Venture Capital Funds	Being a party to present Venture Capital funds or those to be newly established for the investments to be made specific to Agriculture and Food sectors aimed at increasing added value (İstanbul Development Agency's "Regional Venture Fund Financial Support Program" may constitute a model)	Meso Investment (> 100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.1.4	Supporting the entrepreneur ecosystem and developing cooperations	Building entrepreneurship incubators specific to Agri-Food. Organizing cooperation development programs with entrepreneurship incubators. **Regional**: Studies may be conducted in cooperation with the universities in the region	Micro Investment (>10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.4.1.5	Supporting academic and technical consultancy	Financially supporting the services that producers and enterprises need in production, marketing, management, R & D, etc., that they will receive from universities and engineering/consultancy firms, and increasing the ratio of existing supports (for example, supports in TUBITAK, KOSGEB projects) **Regional**: Regional programs can be designed	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

Alt Strateji E.4.2	**Supporting (focused) R&D activities**			
Action E.4.2.1	Conducting seed improvement studies in products specific to the region	**Regional**: Supporting seed improvement activities aimed at increasing drought tolerance, quality and efficiency regarding products specific to the region and/or are important for the region, foremost grape, paddy, wheat, colza and sunflower seed	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
	Supporting extraction projects in products specific to the region	**Regional**: As in supporting R&D projects aimed at the extraction of dye and antioxidants within the grape and its seed, and aroma and active substances of medicinal-aromatic plants, which are beneficial to health		
	Supporting functional, healthy food development activities	Supporting healthy and functional food development activities that show an increasing trend in consumer preferences. The importance of strengthening the immune system in combating diseases with the COVID-19 crisis has become more prominent, and the need and demand for healthy products has increased. It is important to develop healthy products in the protection of public health. **Regional**: Grape and sage may be considered primarily in the region		
	Supporting starter culture development activities	Development of cheese, yoghurt and sausage starter cultures, foremost traditionally produced local cheeses **Regional**: Region-specific (Malkara aged cheese, white cheese) starter culture development activities can be supported.		

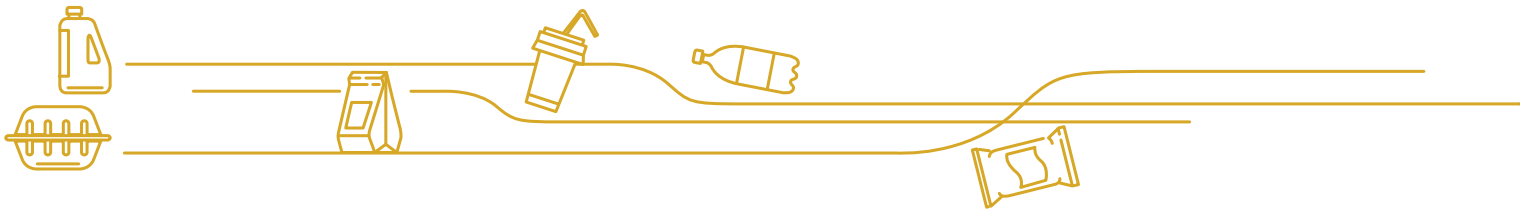
	Supporting the development of packaging, shelf life extension techniques	Supporting the development activities of long shelf life products and packaging types that have started to gain importance in consumer preferences (eg, easy-open lid, small packaging). (E.g.: Projects of presenting products with protein content in small packages) In the COVID-19 crisis, it has been observed that domestic stocking for food security has increased. It seems that there is a need to develop techniques that extend the shelf life for long-term storage of the products. **Regional**: Dairy products may be considered primarily in the region.		
	Supporting research on new usage areas of medicinal and aromatic plants	Supporting R&D projects by taking into consideration the cooperation with the pharmaceutical industry and the food industry for the usage areas of medicinal-aromatic plants with value-added, health-oriented (medicine, preservative food) wide alternative use potential. **Regional**: Regional programs should be designed		
	Supporting efficient, drought-resistant seed development activities	Development of drought-resistant seeds to prevent yield losses in agricultural production caused by global warming as a result of climate change **Regional**: Supports can be provided according to the product pattern of the region. (E.g.: grape, rice, colza, sunflower seed, wheat) There is a risk that climate change will decrease harvest productivity, thus jeopardizing supply security. The importance of drought-resistant seed has increased in order to ensure supply assurance.		
	Supporting alternative Feed and Food projects (fungus, microalgae, insect etc.)	Supporting R&D and investment activities aimed at reducing feed costs and meeting the protein needs of the increasing population that may be endangered		
	Supporting the R&D studies of feed additives	Supporting R&D activities for domestic production of feed additives, which have an important share in feed costs. Domestic production of additives, which have a significant share in costs in terms of society's access to meat and dairy products with high nutritional value for their health, will support the reduction of costs. However, it will contribute to the elimination of supply risk during crisis periods when international trade is restricted.		
	Supporting agricultural production technology development projects	Supporting projects for the development of soilless agriculture, vertical agriculture, hydroponic and aquaponic farming practices		
Action E.4.2.2	Giving priority/ privilege to contractual R&D activities	That the support given to R&D activities conducted with the joint application of the user and developer aimed at supporting cooperations ranks in priority and/or the amount of support is increased	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)



Action E.4.2.3	Supporting national and international R&D collaborations	Ensuring that companies become a member of the TUBITAK-TUGIB Food Innovation Platform Informing companies about international projects (IPA, Horizon 2020, COSME) and developing cooperation with universities and Technology Transfer Offices on project writing. Application for H2020 to a project similar to IPA project, which is conducted by KOSGEB for the promotion of COSME and provision of project writing support. Supporting memberships to international clusters and umbrella organizations **Regional**: Businesses in the region can be supported in writing projects	Micro Investment (>10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action E.4.2.4	Supporting projects for the development of Agriculture 4.0, Food 4.0 technologies	Supporting development projects for the application of digital technologies to Agriculture and Food (E.g.: Greenhouse practices)	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

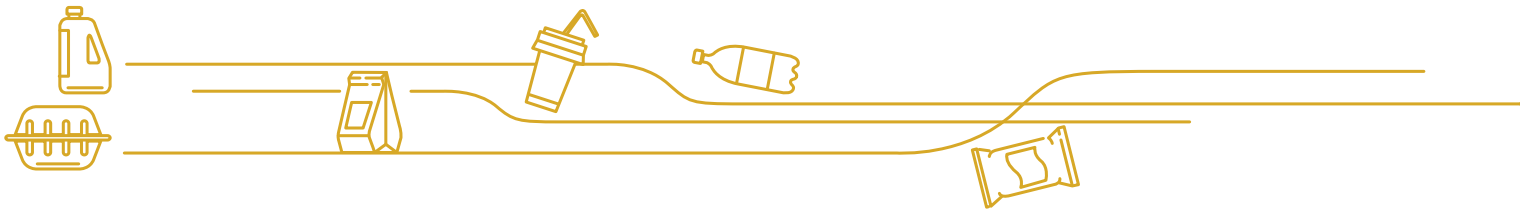
Sub-strategy E.4.3	**Supporting investments that will increase added value**			
Action E.4.3.1	Preparation of milk cold chain feasibility studies	Conducting the needs analysis of milk cold chain infrastructure throughout the country where all provinces are taken into consideration. Preparation of appropriate infrastructure feasibility for provinces/regions by considering criteria such as company scales, transportation distances, etc. Increasing the quality of the product will lead to an increase in the price of agricultural products, therefore the income of the producers, and the quality of the end product.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.4.3.2	Supporting milk cold chain establishment projects	Implementing milk cold chain feasibility studies throughout the country, supporting investments Increasing the quality of the product will lead to an increase in the price of agricultural products, therefore the income of the producers, and the quality of the end product.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.3	Supporting fruit and vegetable processing plant investments	**Regional**: Support may be provided aimed at the processing and drying of grape, the production capacity of which is high in the region.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.4	Supporting investments in the processing of medicinal and aromatic plants	Supporting investments in the processing of medicinal and aromatic plants that can be commercialized. **Regional**: Lavender and sage should be considered primarily.	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)

Action E.4.3.5	Supporting extraction investments in products specific to the region	Regional: Supporting investments aimed at the extraction of the active substances (antioxidant, aroma, dye etc.) of products such as grape, wheat, germ extract, medicinal and aromatic plants (lavender, sage)	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.6	Supporting organic and good agricultural practices	Modeling organic and good agricultural practices and supporting investments of entrepreneurs **Regional**: Entrepreneurs in the region can be supported. Grape should be considered primarily In parallel with the increase in demand for healthy products during the pandemic period, the demand for organic products has also increased. With the supports, it can be ensured that the demand for healthy food can be met.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.7	Supporting analysis laboratory investments	Supporting investments according to the results of analysis laboratory needs analysis in provinces/regions	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.8	Supporting packaging, packing investments	With the COVID-19 pandemic, the demand for packaged products and products in small packages has increased, as they are healthy and have a long shelf life. It will be appropriate to support packaging investments to meet the demand. **Regional**: Medicinal-Aromatic Plants, Dairy products sectors can be prioritized.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.9	Supporting cold chain investments in distribution	With the increase in domestic consumption and the widespread use of home delivery service, there has been a significant increase in the number of delivery points. It is important to develop the cold chain so that food products can be transported without spoiling. It would be appropriate to support the investments of cargo companies and other distributors in the cold chain **Regional**: Dairy products should be prioritized	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.4.3.10	Supporting (organic and inorganic) fertilizer investments	Supporting investments to reduce foreign dependency in fertilizer, which is one of the inputs that have an important place in the costs of agricultural production	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)



Strategy E.5:	Providing access to the market			
Sub-strategy E.5.1	Supporting Infrastructures			
Action E.5.1.1	Supporting e-commerce applications and training	Supporting the training, consultancy activities and investments of businesses for digital marketing (e-commerce, virtual fair, virtual meeting, etc.) applications that gain importance day by day in consumers' preferences. Promoting the e-commerce platform of the T.R. Ministry of Agriculture and Forestry among agricultural producers and businesses, strengthening digital infrastructure **Regional**: E-trade applications are not widespread in the region. Agricultural producers, cooperatives, and food industry businesses can be supported The need for short supply chains has increased during the pandemic. It is important to support distribution channels with less contact.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.1.2	Designing restaurant models for Turkish Cuisine and local product markets abroad	Realization of the project for the design of Turkish food in accordance with the culture and socioeconomic structure of the targeted countries and the design of model restaurants	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.5.1.3	Supporting the investments and branding activities of restaurants/ local product markets for Turkish Cuisine abroad	Supporting investments and branding activities of Turkish Cuisine Restaurants/Local product markets that will contribute to the increase of food exports by using Turkish products abroad, in accordance with the designed models	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)
Action E.5.1.4	Establishing food banks, organizing food delivery campaigns to schools	Reducing the risk of producers' access to the market by ensuring that products such as milk, egg, etc. are distributed to students in schools, ensuring healthy nutrition of new generations. Supporting the establishment Food Banks by local governments, where surplus food products (products that cannot be sold in supermarkets during the day, etc.) and food donations of food banks and those who want to provide social aid are collected **Regional**: School campaigns can be organized in cooperation with local governments and cooperatives In the pandemic, difficulties were experienced, especially in the access of poor households and the elderly to food. With the organization of local governments and foundations, food distribution will be provided to these segments through food banks.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)

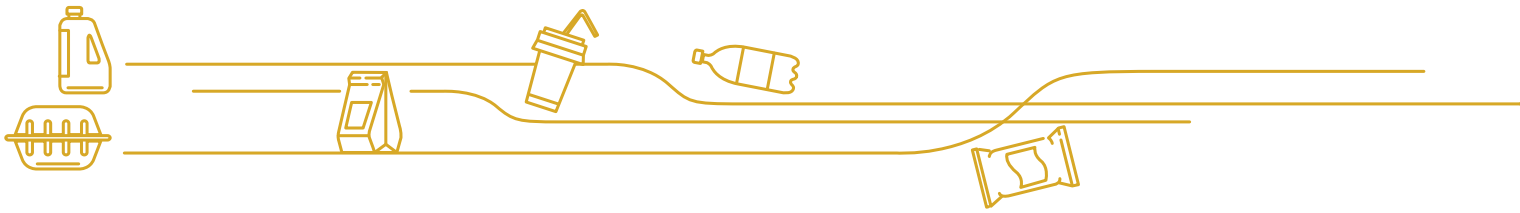
Action E.5.1.5	Establishment of Smart/ Digital Logistics Centers	Supporting the establishment of Digital Logistics Centers where farmers/cooperatives bring their products to buyers under the leadership of local governments, supply and demand, idle capacities and logistics demands of logistics providers are brought together in a digital environment, and sales can be made through e-platforms **Regional**: Digital logistics centers can be established on the basis of provinces/districts. By providing fast access to information, it will be possible to make production planning and use resources efficiently, to ensure that producers participate in the value chain more effectively, to shorten the supply chain and contribute to food safety and security.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)
Action E.5.1.6	Establishment of foreign trade intelligence centers	Supporting the establishment of Foreign Trade Intelligence Centers in the regions according to the needs analysis results	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.1.7	Establishing national trade centers abroad	Supporting trade centers to ensure the determination of customer needs by increasing the intensity and speed of customer communication in foreign markets	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.1.8	Establishment of private sector trade center/ contact office abroad	**National/Regional**: Supporting the establishment of trade centers/contact offices established in cooperation with private sector representatives to ensure the determination of customer needs by increasing the intensity and speed of customer communication in foreign markets. A cooperative study may be conducted with Wine, Dairy Products, Flour, Vegetable Oil sectors. It can also be considered in cluster projects. Foreign Logistics Support	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.1.9	Establishment of Virtual Fair	**National/Regional**: Establishment of a virtual fair (with the support program of the Ministry of Trade) where the items produced in the country/region are promoted	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.1.10	Setting up neighborhood bazaars for times of crisis	During the COVID-19 pandemic, there were difficulties in accessing food due to the risk of transmission. Developing the design of neighborhood/district bazaar in which protection measures are taken into account, determining the places where the markets will be set up. **Regional**: If a national program is not designed, regional studies can be carried out.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)



Sub-strategy E.5.2	Training and Consultancy Activities			
Action E.5.2.1	Design of One-Stop Shops/SME Support Offices	Designing a central coordination unit that provides access to test/analysis, information, training and consultancy services required by companies and/or communication with relevant organizations. (It includes the Continuing Education Center (CEC) or the first contact with this institution is made through the One-Stop Office/SME Support Office.) (Introducing financial support mechanisms to enterprises, providing test/analysis services or providing information on which institutions they can be obtained from, ensuring the coordination of all services needed by SMEs such as foreign trade intelligence and training from a single unit). (Financial Supports, Technical Support -Test, Analysis, Consultancy-, Training and Foreign Trade units can be considered) Creating a model suitable for the structure and culture of Turkey by examining the successful examples in the world (for example, Suzhou Industrial Park established by China-Singapore partnership). (The online setup of the building in digital environment can also be taken into consideration) **Regional**: In the absence of a national action, regional studies can be carried out	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.5.2.2	Establishment of One-Stop Shops/ SME Support Offices	Establishment of Designed One-Stop Shops/ SME Support Offices **Regional**: In the absence of a national action, regional studies can be carried out	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.5.2.3	Providing foreign trade training and promotion of support	Supporting training activities aimed at eliminating the lack of knowledge on foreign trade intelligence, marketing methods, legislation, financing and export support mechanisms in enterprises **Regional**: It is considered to be among the needs of the companies in the region.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.5.2.4	Providing branding training and support	SMEs cannot take a sufficient place in foreign markets and create market diversity due to lack of knowledge in business planning, marketing and promotion methods. It will be ensured that the training programs of companies for branding are organized and financially supported. **Regional**: It is considered to be among the needs of the companies in the region.Designing special support programs specific to products such as grape and strawberry, which have branding potential	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

Action E.5.2.5	R&D and Innovation Management, Human Resources Management, Efficiency, Energy Efficiency training (Financing management training has been evaluated under the heading access to finance)	**National/Regional:** It has been observed that companies have low competencies in R&D and Innovation, hiring qualified personnel and efficiency activities. There is a need for increasing the competencies of companies in these matters.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action E.5.2.6	Geographical sign promotional/ informative activities	Products with Geographical Indications have not received the expected attention from consumers. Promotional and informative activities aimed at the importance and added value of the geographical indication will be supported. **Regional:** Regional studies can also be carried out	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

Strategy E.6:	**Skill and Capacity Building**			
Sub-strategy E.6.1	**Development of Vocational Education Infrastructure**			
Action E.6.1.1	Capacity building of Vocational Education Institutions	Modeling successful Vocational High Schools (Manisa OIZ, Ankara OIZ, etc.) and implementation of the practices, primarily in high schools transferred to the Chambers of Commerce and Industry in 81 provinces by the Ministry of National Education. Establishing vocational high schools close to industrialists (which can be considered in OIZs), ensuring that the training is carried out practically, ensuring that students work as part-time or full-time interns and encounter real cases in companies during their education. **Regional**: Vocational High Schools transferred to the Chambers of Commerce and Industry within the scope of MoNE's program can be supported	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.6.1.2	Establishment of Farmers' Training Institutes	Establishing institutes by examining Deula/Germany and/ or other successful Institutes and constructing a model suitable for the country. Providing practical training with exemplary facilities, providing incentives for participation in training. Adapting/transferring successful sample practices in T.R. Provincial Directorates of Agriculture and Forestry to the Institute (Thanks to the training of farmers, excessive use of pesticides and fertilizers will be prevented, therefore costs will be reduced and the damage to the soil caused by excessive use of pesticides and fertilizers will be prevented) Monitoring the applications of those who received certificate and carrying out impact assessment studies. **Regional**: In the absence of a national initiative, a regional Farming Institute can be established The knowledge and education level of farmers affect resource efficiency, the yield and quality of agricultural products, and the preservation of the structure of agricultural lands. The inaccurate traditional practices of farmers endanger sustainability.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)



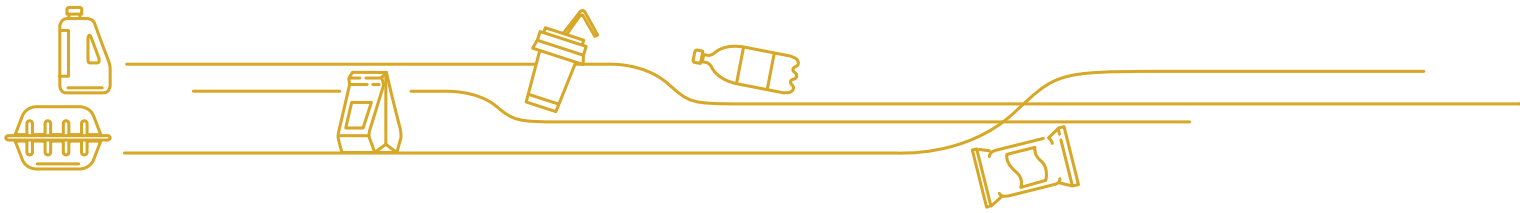
Sub-strategy E.6.2	Development of Professional Education System			
Action E.6.2.1	Dissemination of Continuing Education Centers (CEC)	Establishment of University-supported Continuing Education Centers, providing training to institutions and individuals in line with needs analysis. Implementation of educational programs on Lean production, Quality Control, HACCP, Intellectual Property Rights, Project Writing etc. **Regional**: It will be appropriate to add the subjects of Efficiency Increasing Methods, Energy Efficiency, Human Resources Management, Branding, FMH, R&D and Innovation, human resources/databases to the education topics of Continuing Education Centers.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action E.6.2.2	Dissemination of applied education in universities	Ensuring that senior university students (and graduate senior students) work part-time in companies, and prepare their final paper (master's thesis) practically on a real problem in the industry. **Regional**: Thesis studies in industry can be financially supported	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)
Action E.6.2.3	Establishment of Digital Transformation Centers (model facility, model factory) for Agriculture 4.0 (Digital Transformation in Agriculture/ Smart Agriculture) and Food 4.0 (Digital Transformation in Food Industry) technologies	Designing and supporting projects for Agriculture 4.0 and Food 4.0 similar to Digital Transformation Centers that started to be developed in Turkey It will contribute to ensuring productivity and sustainability in agricultural production and food industry **Regional**: It will be appropriate to establish a digital transformation center aimed at Food 4.0 in the region.	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)

Strategy E.7:	Ensuring access to financial resources			
Sub-strategy E.7.1	Improving financial support systems			
Action E.7.1.1	Emphasizing efficiency and cooperation in the investment support model	Creating models that consider the increase in productivity and cooperation in agricultural product support Increasing the amount of supply by increasing the efficiency of agricultural activities is important for keeping the income of agricultural producers at a certain level by decreasing the costs, for the producers to continue these activities and thus to ensure supply security.	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)

Action E.7.1.2	Establishing a crisis fund, providing financing support to negatively affected sectors and the labor force whose employment is required	As seen in the COVID-19 pandemic, in the negatively affected industries, especially in the restaurant, cafe, hotel, food service (catering) industries, a chain of income loss, problem of collection and cash flow, and a decrease in employment have been experienced. By establishing a crisis fund, the negative effects of the industries adversely affected by the crises on the entire industries will be prevented and the continuity of employment will be ensured. At the same time, if the supply cannot be provided during periods such as harvesting and pruning, financial support will be provided to the labor force that endangers agricultural production, especially when it is difficult to employ in pandemic period, and whose wages are increased.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action E.7.1.3	Developing the financial information of producers and industrialists	Introducing alternative financing resources, national and international financing support mechanisms (investment, export, R&D etc.) to producers and industrialists, providing training in cost accounting, financial risk management and financing management **Regional**: Providing training on regional/provincial basis	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

10.2. Actions within the Social Scope

		Explanation	Estimated Budget	Implementation Time (Year)
Strategy S.1:	**Increasing the level of social life in the countryside**			
Sub-strategy S.1.1	**Increasing the attractiveness of rural life**			
Action S.1.1.1	Increasing the number and quality of rural schools	Solving the problem of access to educational services, which is one of the important reasons of rural-to-urban migration, by increasing the number and quality of rural schools By making rural life attractive, the continuity of the labor force will be ensured in order to sustain agricultural production.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action S.1.1.2	Establishing sports facilities and social facilities	Establishment of sports facilities aimed at enriching social life in rural areas and social facilities where internet access is provided free of charge **Regional**: Investments can be made in rural areas	Macro Investment (>1 Billion TL & <10 Billion TL)	Long Term (3-10 Years)
Action S.1.1.3	Providing social assistance to those engaged in agricultural activities in rural areas	Providing direct or indirect financial support (such as covering insurance premiums) to producers who have difficulty in making a living in rural areas. Grading the supports considering production and efficiency **Regional**: Producers in the region can be supported (young, women and disabled entrepreneurs can be given additional support)	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)



Action S.1.1.4	Developing projects to improve social life in rural areas	Organizing idea contests for the improvement of social life in rural areas. Application to EU-funded financial support programs for projects **Regional**: Project development studies of public institutions, local governments and non-governmental organizations in the region can be supported	Macro Investment (>1 Billion TL)	Long Term (3-10 Years)

Strategy S.2:	**Strengthening the Food Safety and Security System**			
Sub-strategy S.2.1	**Making improvements in legislation**			
Action S.2.1.1	Improving inspection method	Developing the infrastructure and increasing human resources systematically to increase the number of periodic inspections according to the product risk group By ensuring food security, society will be able to access healthy food.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action S.2.1.2	Making HACCP implementation mandatory in food processing companies	Making the HACCP (Hazard Analysis and Critical Control Points) system mandatory in food processing companies in order to ensure hygiene in food businesses, providing financial support and training in this regard **Regional**: Training support can be provided to companies in the region.	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)
Action S.2.1.3	Prevention of cartelization in retail chain markets	Preventing the increase in prices by joint decision by increasing the frequency of the inspections with the consumer information platform. Restricting the private brands of the markets. Ensuring equal competitive conditions with alternative sales points by increasing tax and insurance premium audits	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)

Sub-strategy S.2.2	**Consumer Awareness Activities**			
Action S.2.2.1.	Supporting organizations for awareness-raising promotional activities	Supporting the promotions of umbrella organizations to inform consumers about imitation and fraud and eliminating consumer's lack of information **Regional**: Organizations in the region can be supported	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action S.2.2.2	Establishment of a platform that will provide continuous access to the information of the adulteers	T.R. Ministry of Agriculture and Forestry periodically publishes those who adulterate in food. However, its awareness is not high and its access is not continuous. Continuous accessibility will be provided by designing a digital platform. **Regional**: In the absence of a national initiative, umbrella organizations can be supported for the establishment of the infrastructure	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action S.2.2.3	Ensuring that the nutritiveness is perceived by the consumer with markings on the products	Putting colored signs to distinguish between nutritious and harmful (sugary, salty) products by making changes in the legislation. Increasing the tax on unhealthy products.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)

Strategy S.3:	Ensuring social equality			
Sub-strategy S.3.1	**Establishing financial support mechanisms**			
Action S.2.3.1	Providing positive discrimination to women and disabled citizens	Increasing financial support, regulation of special grant and micro-credit programs for women entrepreneurs, disabled citizens	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action S.2.3.2	Providing training to immigrants (Syrian, Afghan) to engage in agricultural activities and giving financial support	By creating a job area for immigrants (by giving temporary work permit and/or permanent work permit in accordance with the law), it will be possible to ensure their livelihood and to overcome the labor bottleneck in agriculture. **Regional**: Regional support can be applied The repetition of the labor bottleneck experienced during the harvest period in the COVID-19 pandemic can be prevented	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

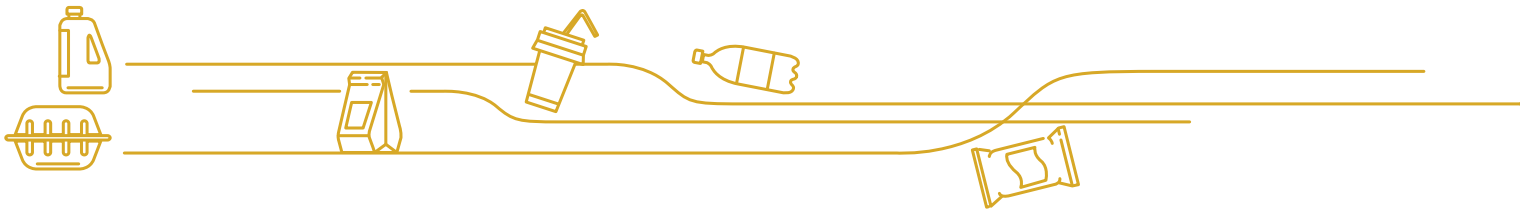
10.3 Actions within the Environmental Scope

		Explanation	Estimated Budget	Implementation Time (Year)
Strategy Ç.1:	**Ensuring efficient use of water resources**			
Sub-strategy Ç.1.1	**Improving the agricultural water infrastructure**			
Action Ç.1.1.1	Conversion of open water transport systems to closed water transport systems	Transporting water to agricultural areas often causes great losses. By transforming open water transport channels into closed channels, a great contribution will be made to the efficient use of water. Continuity of agricultural production and supply security can be achieved by efficient use of resources. **Regional**: Since the rate of vaporization is high, the rate of water losses during transport is high in the region. Therefore, the importance of the project increases.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action Ç.1.1.2	Dissemination of pressurized irrigation systems	By using drip irrigation, underground drip irrigation, sprinkling techniques, controlled irrigation and water savings will be achieved, and the damage caused by excessive irrigation will be reduced (soil erosion, calcification, groundwater rise, etc.) **Regional**: It becomes important for the efficient use of water resources and for increasing efficiency in production.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)

Action Ç.1.1.3	Supporting pressure irrigation systems workmanship	Installation and dismantling of the equipment system in drip irrigation requires intensive labor and time. This may cause farmers not to prefer drip irrigation. It would be appropriate to financially support the labor force for drip irrigation systems. **Regional**: Producers in the region can be supported	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action Ç.1.1.4	Relieving the underground waters in Meriç River by providing water transmission	**Regional**: Underground waters also decrease by the intense use of industry. The problem of the region's watering will be lessened by benefiting from the high water capacity of Meriç river	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action Ç.1.1.5	Prevention of water waste in agricultural irrigation	Water consumed in agricultural irrigation is priced based on the size of the irrigated land (per decare) regardless of the amount of water consumed. The necessary infrastructure will be established to make the pricing according to the amount/volume consumed, it will be ensured that the producers plan and save water and the problems caused by excessive irrigation will be solved	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy Ç.1.2	**Improving Natural Water Resources, Industry, City Water Infrastructure and increasing reserves**			
Action Ç.1.2.1	Determining Ergene River's polluters and taking precautions	**Regional**: The abundance of pollution in Ergene River threatens ecology.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action Ç.1.2.2	Establishing effluent treatment plants	**Regional**: Ensuring that industrial and domestic wastes are treated and water is transmitted to rivers by being cleaned	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action Ç.1.2.3	Ensuring the recovery of industrial waste waters	**Regional**: The industry's capacity of using water is high.The development of a project aimed at the recovery of calescent and discharged, hot but clean water should be prioritized.	Macro Investment (>1 Billion TL)	Long Term (3-10 Years)
Action Ç.1.2.4	Increasing the supervision of industrial waste water	Increasing the infrastructure and human resource capacity aimed at increasing supervision periods of companies that harm underground and surface water	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action Ç.1.2.5	Renewal of drinking water distribution pipes	Losses are also high in the pipes carrying the municipal water supply. Water savings will be achieved by renewing the pipes.	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action Ç.1.2.6	Establishment of underground dams	The amount of available water will be increased by accumulating underground water that is not used efficiently in dams. **Regional**: It will be possible to ease water stress by ensuring that the projects designed for the region are used	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)

Strategy Ç.2:	Ensuring the recycling of waste			
Sub-strategy Ç.2.1	**Bringing industrial and agricultural waste to the economy**			
Action Ç.2.1.1	Preparation of feasibility studies of whey processing plants	Realization of the research project of alternative whey usage areas. Conducting the analysis of nationwide whey capacity and needs analysis of whey drying facility where all provinces are taken into consideration. Preparation of appropriate infrastructure feasibility for provinces/regions by considering criteria such as company scales, transportation distances, etc. **Regional**: Determining the needs and problems of the whey facility, which is not in use in the region	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action Ç.2.1.2	Supporting the investments in whey processing facilities	Supporting related investments in line with feasibility studies. Supporting idle facilities to be activated by feasibility studies. **Regional**: Supporting and activating the whey facility, which is not used in the region as a result of the analysis	Micro Investment (>10 Million TL & <100 Million TL)	Medium Term (1-3 Years)
Action Ç.2.1.3	Preparation of feasibility studies of plantal and animal waste evaluation facilities suitable for the region	Investigation of alternative usage areas of waste such as national plantal waste, chicken litter, animal manure, animal waste (meat and bone products etc.). Conducting nationwide waste capacity (inventory calculation) and needs analysis, where all provinces are taken into consideration. Preparation of appropriate infrastructure feasibility for provinces/regions by considering criteria such as company scales, transportation distances, etc. **Regional**: Considering the greenhouse cultivation, agricultural activities and seedling capacity in the region, the need for compost can be met by evaluating the wastes in Compost Processing facilities. Compost feasibility should be considered first.	Nano Investment (<10 Million TL)	Medium Term (1-3 Years)
Action Ç.2.1.4	Supporting investments in plantal and animal waste utilization facilities suitable for the region	Supporting related investments in line with feasibility studies. **Regional**: Supporting the lucrative project following feasibility comparisons	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)



Strategy Ç.3:	Adapting to climate change			
Sub-strategy Ç.3.1	**Supporting energy saving applications**			
Action Ç.3.1.1	Spreading inefficient engine replacement support	Increasing the budget of inefficient engine replacement support implemented by KOSGEB and making it widespread	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)
Action Ç.3.1.2	Supporting Energy Efficiency Studies	Providing consultancy services to companies in this regard **Regional**: In the region, the manufacturing of flour, rice, vegetable plant and the energy studies of dairy products companies will be appropriate	Nano Investment (<10 Million TL)	Medium Term (1-3 Years
Action Ç.3.1.3	Supporting Investments that will provide Energy Efficiency	**Regional**: It will be appropriate to support energy efficiency investments that may provide cost advantage	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)

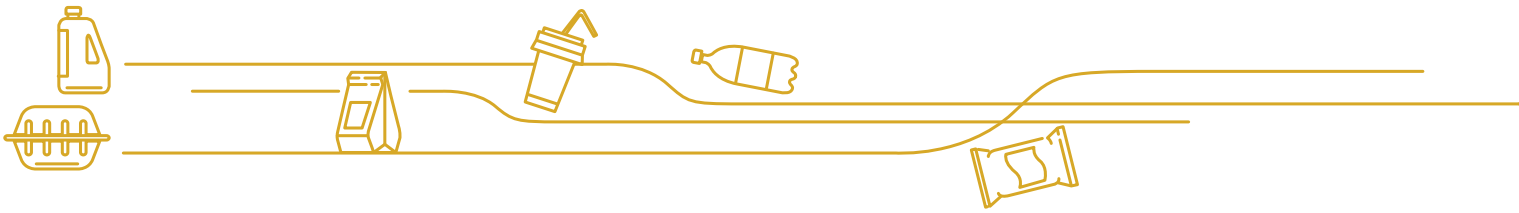
Sub-strategy Ç.3.2	Supporting climate change adaptation activities			
Action Ç.3.2.1	Establishing the climate change adaptation fund	Supporting projects aimed at adapting to climate change	Mega Investment (>10 Billion TL)	Long Term (3-10 Years)
Action Ç.3.2.2	Ensuring compliance with Green Deal guidelines	Supporting projects developed to comply with the Green Deal Criteria accepted by the EU Financial support of companies and institutions applying to EU programs in this regard **Regional**: Supports can be provided to companies in the region	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Strategy Ç.4:	Reducing food losses			
Sub-strategy Ç.4.1	**Improving storage/transport systems**			
Action Ç.4.1.1	Cold chain installation for perishable products (fruit and vegetables) and food distribution	Product losses can reach 50% during the transportation of fruit and vegetables. Supporting the relevant investments by designing the appropriate system as a result of the feasibility study. It would be appropriate to design the project for both agricultural products and processed food products. With the widespread use of the home delivery system, the need for cold chain in food distribution has increased. Reducing food losses, reducing costs and prices, facilitating access to food and efficient use of resources will contribute to sustainability.	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Action Ç.4.1.2	Supporting Licensed Warehouses	Establishment of licensed warehouses can be supported by conducting needs analysis	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy Ç.4.2	Evaluation of inert products			
Action Ç.4.2.1	Development of the project of transferring products not sold in supermarkets to Food Banks	Ensuring that fruits and vegetables whose expiry date is approaching in supermarkets that cannot be sold during the day, are collected and transferrred to food banks, and that they are evaluated more efficiently, like in the examples abroad **Regional**: With the local governments in the region, the use of inert fruits and vegetables can be achieved	Meso Investment (>100 Million TL & <1 Billion TL)	Long Term (3-10 Years)

Sub-strategy Ç.4.3	Protecting ecology			
Action Ç.4.3.1	Prevention of excessive use of fertilizers and pesticides by farmers	**National/Regional**: Providing special training to farmers on plant breeding, designing practical incentives (income/harvest insurance can be used to eliminate the farmers' perception of risk) Contribution to sustainability will be provided by the efficient use of resources and by preventing the degradation of agricultural supplies.	Micro Investment (>10 Million TL & <100 Million TL)	Long Term (3-10 Years)
Action Ç.4.3.2	Improving the structure of agricultural land	**National/Regional**: Lands that are poor in organic matter reduce productivity. Development of the project to increase the amount of organic matter in lands and similar land improvement projects (good agricultural practices). Utilization projects of agricultural waste in compost treatment can be combined with this project.	Macro Investment (>1 Billion TL)	Long Term (3-10 Years)



11. Conclusion and Evaluation

The food industry, which develops based on a labor-intensive system, is directly related to the utilization of agricultural products, the supply of raw materials to the industry, its contribution to employment and a balanced diet of the people. Food industry is one of the industries that has the most important socio-economic effects, as food intake has a direct impact on the health and welfare of the society.

Global agri-food trade has more than doubled between 1995 and 2019, reaching 1.5 Trillion USD from 680 Billion USD. Since early 2000s, countries with upper-middle and lower middle incomes have been increasing their share in global agri-food exports. This ratio increased from approximately 25% in 2001 to 36% in 2018. A large part of the agri-food trade includes processed food products of the food sector. Whereas the share of food in total agri-food export was about 70% in 2000, it reached up to 76% in 2018. The largest shares in global trade are fruits and vegetables (23%), Cereal and cereal products (14%), Fisheries (11%), Meat and meat products (11%), Beverages (8%), Animal and vegetable oils (%) 6), Dairy products and eggs (6%), Sugar and honey (3%) and Other foods (16%). The top five countries with the highest imports in world trade are the USA, China, Germany, Japan and the Netherlands. The ranking in exports is the USA, the Netherlands, Germany, Brazil and China. The Global Market for Food Products is expected to reach 8 trillion USD in 2021, and the market is expected to grow at an annual rate of 3.1% between 2020-2025. It is foreseen that Confectionery and Snacks will constitute the largest part of the market with 1.4 trillion USD for 2021 and China will be the largest market in the world with a turnover of 1.3 trillion USD.

According to data of 2019, in Turkey, Food Products Manufacturing industry (Food Industry) is one of the industries with the highest share in manufacturing industry with the rate of 13.6%. According to the data of 2018, 515 thousand employees were employed in 49 thousand companies, and a turnover of 296 billion TL (61 billion USD) was realized. The highest shares in the "added value with factor cost" created are respectively "Manufacture of other foodstuffs", "Manufacture of bakery products", "Processing and storage of vegetables and fruits" and "Manufacture of dairy products". With the decline in the "Meat processing and storage and production of meat products" industry between 2010 and 2018, this industry fell from fourth place to sixth in value added creation. The decline in the "10.12: "Poultry meat processing and storage" sub-sector has a major impact on the occurrence of this situation. The Iraqi market, which has high economic uncertainties, has a large share in exports (about 60%) and price-oriented competition are seen as the main problems of this industry and the associated "Egg" production industry. Industries that show a successful performance in the increase in "value added per employee", which is accepted as an indicator of productivity, "Processing and storage of fish and aquaculture products", "Manufacture of ready-made animal feed", "Processing and storage of vegetables and fruits" and "Manufacture of solid and liquid vegetable and animal oils".

In crop production, between 2010 and 2019, there was an increase of approximately 20% in the amount of vegetables, 34% in fruit, beverage and spice plants, and 5% in cereals and other herbal products. Considering that the population growth rate was 12.8% in the same period, it is seen that the increase in grain production remained low. Growth rates are higher in livestock and fisheries. In the same period, the number of bovine animals increased by 56%, the number of ovine animals by 52%, the number of eggs by 68%, the amount of poultry meat by 48% and the number of beehives by 45%. In aquaculture production, there was a 5% decrease in fishing, but a high (123%) increase in aquaculture.

In the 2010-2019 period, according to economic activities, agri-food exports (4.5% annually on average) of Turkey increased more than its imports (4.2% per year on average) and its foreign trade surplus reached 3.36 billion USD. The share of processed food products in exports increased from 63.5% to 71.8%. In imports, unlike exports, the share of unprocessed agricultureal products is higher than processed food products, and this item creates a significant foreign trade deficit. Wheat imports for export purposes of flour and pasta production have the biggest share. This is followed by oil seeds and other feed raw materials used in feed and vegetable oil production. The export performance of Turkey (average annual growth rate: 4.53%) remained above the world export growth rate (3.57%), through which its share in the world agri-food products increased from 1.04 % to 1.13%.

However, since the average annual rate of increase in "Edible foods and nuts", which has the largest share in exports of agri-food products of Turkey (2.01%), is far behind the global export growth rate (5.92%), and its share in world exports decreased from 4.60% to 3.28%. Similar low performance has also been experienced in "Edible vegetables and some roots and tubers" and "Various edible food preparations (coffee extracts, tea extracts, yeasts, sauces, diet foods, etc.)".

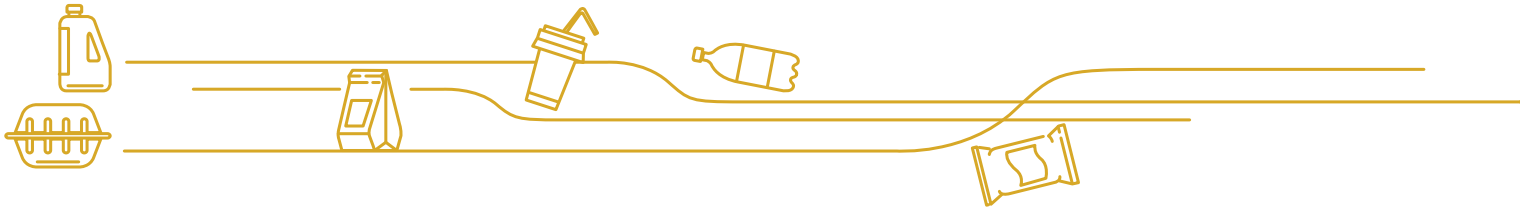
Among the products that have a high rate and amount in the increase in Turkey's agri-food exports, it is seen that the industries of "Cereals, flour, starch or milk preparations, pastry products" whose raw material is mostly based on the import of "wheat" and "Milling products, malt, starch, inulin, wheat gluten" where "wheat flour" has the largest share.

"Fisheries and aquaculture" has achieved the most successful performance in export growth with an annual average increase of 13%. There was also a significant increase in exports in the sections of "Dairy products and eggs", in which "Egg" and "Cheese", which are among the products with a high share in exports, "Meats and edible meat offal" and "Animal and vegetable oils" where "poultry meat" has a 97% share.

When the export performances are evaluated, it is seen that the country has started to lose its competitive advantage in the industries of "Edible fruits and nuts", "Edible vegetables and some roots and tubers" and "Various edible food preparations", whose share in world exports decreased, and there is a need to take measures. The same is true for the "Poultry" and "Egg" industries, where the "added value with factor cost" declines and concentrates on price-oriented competition. Exports of cereal products have also decreased, and products based on wheat imports (pasta, wheat flour) have a high share in exports. The industry is faced with a high supply risk due to trade restrictions as a result of protectionist measures during crisis periods and the possibility of producing countries to enter these industries (producing pasta and wheat flour).

The COVID-19 pandemic has created disruptions and changes in the food supply chain. Its main effect is seen in changing places of consumption of food. With the closure of hotels, restaurants, cafes and schools, out-of-home consumption has come to a halt, and domestic consumption has increased. With the increase in domestic consumption, the load in retail stores, electronic commerce and home delivery services increased. Local products and local vendors have become more preferred. The other major impact occurred in consumer preferences. Demand for storable pasta, flour, canned, dried and frozen foods with long shelf life has increased. Likewise, there has been an increase in demand for healthy products that support the immune system. Probiotic products, organic products, nutritional supplements are among these products. The demand for packaged products has also increased, as they are considered healthy. Although there was a decrease in the demand for fruit and vegetable products due to the risk of contamination in the early days of the pandemic, the demand increased because of the health after the panic atmosphere passed. Domestic consumption of milk and dairy products has increased due to the fact that they are healthy, but there has been a decrease in total sales in this industry as out-of-home consumption has decreased. Total sales reduced with the decrease in out-of-home consumption in meat products, fish and aquaculture products. Domestic consumption has increased since fish and aquaculture products are healthy, but could not compensate for the industry's loss. In general, there was an increase in food prices. Those who were most adversely affected by the pandemic process were those who run hotels, restaurants and cafes, and companies that sell to these industries and catering companies.

One of the most important facts threatening the food chain is the restriction of exports by grain and oilseed exporting countries trying to ensure their own food security. The availability of sufficient stocks in the country and in the world and the opening of the way for imports by lowering import customs rates have prevented a food bottleneck. Since the plantings were completed when the pandemic started, there was no problem with the crop cultivation. During the harvest period, a labor shortage was experienced. The fact that the majority of the producers are family businesses and the authorization of the producers to work during the quarantine period by the central unit has prevented this problem from being felt deeply. Part of the labor requirement during the harvest and pruning periods was met by migrants. During this period, seasonal labor wages increased. Another problem caused by the pandemic was the restriction of border trade due to contagion reasons. Imports of agricultural inputs were delayed and production (eg fish-feed production) was



disrupted. Likewise, since fresh fruit and vegetable exports could not be carried out, the products were tried to be used domestically. Until exports resumed, there was a decrease in prices in 1-2 months.

There are various factors affecting the food industry in the world. The main ones are income, demographic changes (population growth, population aging, urbanization), changes in consumer preferences (health, social responsibility, organic food, lifestyle changes, trust in the food industry), trends in the supply chain (modern retail market, private brands) and innovation (innovation in the food industry, innovation in packaging, innovation in distribution). In agricultural technologies, precision agriculture, new breeding techniques, agricultural cycle, production of new protein sources, biotechnology come to the fore. In food technologies in industry, robots, data technologies and new production techniques are promising technologies in the short term. In the long run, nanotechnology, 3D printers and cell technology are promising.

In value chain analysis, the fact that inputs are based on imports in agricultural production stands as one of the biggest threats. Transporting water by open transport channels and not using modern irrigation methods cause water to be wasted. Water stress is felt severely in the country and the region. It is seen that the transportation of water through closed channels and the implementation of pressurized irrigation (drip, underground drip, sprinkler) systems have become a necessity rather than a strategic choice for the sustainability of agriculture.

The decrease in arable agricultural lands in crop production poses a great threat to the country. Some of the producers have switched from wheat to corn and sunflower. Wheat cultivation areas have decreased significantly. There was no decrease in total wheat production, and this was achieved with an increase in productivity. However, considering the population growth, it is seen that there is approximately 22% decrease in per capita production. It is seen that the productivity in grain production is behind the European average. In order to reduce wheat, sunflower seed and corn imports, productivity enhancement activities especially in wheat gain importance. Providing water for dry farming areas and seed development studies should be considered as a priority. It seems possible to reduce imports of corn and sunflower seeds by bringing fallow lands to agriculture by alternating planting.

Small scales of agricultural and livestock enterprises are an obstacle to efficient production. The lack of knowledge of the producers, the continuation of wrong practices, their reluctance to implement innovations, the aging of the productive population, the continuing migration to the rural cities and the decrease in the labor force are important problems in agricultural production.

Although the European average in the amount of carcass meat per animal in livestock breeding is caught, it is seen that milk yield is lower than half of the European average. The low fertility rate is an important factor in this. The high mortality rate of calves also leads to an increase in livestock imports. For this reason, it is important to expand veterinary services. At the same time, that the number of somatic cells in raw milk is high except for a limited number of manufacturers in Turkey is presented as the rationale for the EU's not buying the products processed from these kinds of milk. Modernization of dairy farms is important for both accessing alternative markets by lowering unit costs and providing high-quality raw milk production and for the dairy sector's creating market diversity.

In the survey conducted for Food Industry companies, the weakest issue is the low level of competencies in R&D and innovation, which support product differentiation and value-added production. In this respect, the ability to increase and retain qualified personnel, developing university-industry cooperation, and enriching information resources are the competencies that should be brought in companies. Market access competencies are also one of the main weaknesses. Access to finance has been found to be another area that needs improvement. There are issues on which regional firms differ. It is seen that the technologies of the companies in the region are more advanced, but their productivity studies are at a low level. The firms in the region where the capital-intensive industry is predominant should increase their efficiency regarding productivity and include energy efficiency efforts in these activities. The product range of the companies in the region is also limited, and product tracking systems need to be developed.

Climate change is seen as the biggest threat to the sustainability of the agri-food sector. With the increase in temperature in the world and in the country, it is expected that yield decreases in agricultural production. The depletion of water resources, agricultural lands, the degradation of agricultural lands, and the decrease in biodiversity threaten agricultural production. Innovative systems are needed to reduce the impact of these threats. It should be aimed at increasing resource efficiency by using less biomass by ensuring circular economic integration. Although there are facilities that utilize production wastes (eg whey, chicken litter/manure), animal and agricultural wastes across the country, it is seen that they do not have sufficient capacity and do not meet the needs yet.

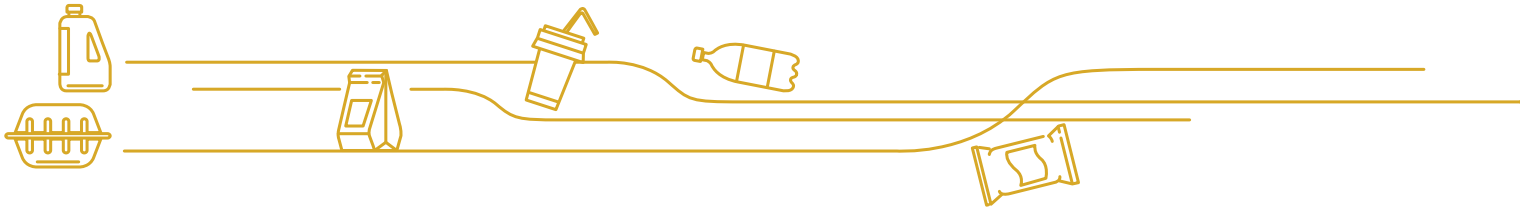
Dairy industry has developed in TR21 Region. Although there is a whey processing plant, which is the waste of dairy enterprises in the region, it remains idle. Considering that the facilities in other provinces of the country work efficiently, it is important to identify and solve the facility's problems in the region and operationalize the facility. In this way, it will be possible both to reduce environmental pollution and to increase added value.

Thrace Region, which encompasses the TR21 Region, is located in an important transition zone between Europe, Asia, the Middle East, and the former Eastern Bloc. Global transit routes and significant investments increase the importance of the region on a global scale. That TR21 Region is the country's gateway to Europe, that it is close to metropolises, which are big markets, foremost being İstanbul, that it is the region least affected by climate change and the development of its industry create opportunities and competitive advantages. Thrace Region has wide and fertile agricultural areas. It is one of the important agricultural production centers of the country with its experience. In Thrace, where agricultural mechanization is high, yield rates are also above the country average.

The main crop production items of the TR21 Region are canola, paddy, sunflower seed, forage peas, wheat, vetch, wheat-greenery, meadow grass and triticale, and aromatic plants lavender and sage. Fruit and vegetable production is low in the region. The most important item in fruit is grape for wine. In stock farming, pure culture dairy cattle and merino sheep come to the fore. Since the TR21 region is declared a free zone and modern stock farming is carried out in the region, it becomes important for the production of meat and dairy products with high added value. Firms engaged in agriculture-based industrial production in Edirne have intensified their investments in the paddy, oil, milk, and dairy products sectors. Kırklareli is a major producer in agricultural production, foremost being oil seeds, and animal breeding. The agriculture-based industry, which includes dairy products, vegetable oil plants, meat processing plants, and flour manufacturing, has developed in the province. In Tekirdağ, oil and fat manufacturing, milk, and dairy products sectors stand out in food. Although the food industry has developed in TR21 Region, it ranks third in size after the textile and clothing sectors in terms of the number of employees in the region. It has a 3.1% share regarding the number of workplaces in Turkey and a 3.2% share regarding the number of employees. The region has a deficit in foreign trade in agri-food products. Flour has the largest share in exports (milling products, malt, starch, inulin, wheat gluten article). This is followed by various food preparations, sugar and sugar products. Grain and oilseeds have the biggest share in imports. As a result of the analyses, it is thought that efficiency studies in the region, product and market diversity should be increased, companies need to move away from price-oriented competition and develop their competencies in the areas of quality, marketing, and R&D with the goal of branding.

As a result of all these evaluations, FAO's guidelines on how to respond COVID-19 were taken into consideration, and national and regional short, medium and long-term strategies were developed to provide solutions to problems within the framework of the concept of sustainability. These strategies are classified within economic, social and environmental scope, which are the basic pillars of sustainability. Within the economic measures, the focus is on the means of participation in the value chain (access to the market, access to training, coordination and cooperation building, access to finance) and factors that create value in the agricultural value chain (increasing quality, increasing system efficiency, differentiated product development).

During the interviews with industry representatives, academics and experts, the lack of communication between the public institutions, university and private sector was emphasized. In



order to solve this problem, it has been proposed to establish National and City Councils where all industry stakeholders will be together to develop strategy and policy proposals for the problems of the agri-food industry. Stakeholders stated that agricultural planning could not be done systematically and that difficulties in accessing data were also a factor in this. For this reason, in order to improve the access to data infrastructure, it is recommended that agricultural enterprises be evaluated and registered as other enterprises operating economically, establishing an agri-food information platform and consumer information platforms, and establishing a planning scientific board. For the management of COVID-19 and similar crises, FAO's Food Crisis Management Framework model will be appropriate, and the measures will be carried out in cooperation with the Agri-Food Crisis Management Committee and National/City Councils to be formed within the relevant public unit.

During the crisis period, ensuring the continuity of the workforce, determining the logistics centers where the products will be collected and planning the distribution organization, in case of difficult border trade, creating plans for import-based strategic products and export products, and holding international negotiations to prevent heavy protective measures were recommended as the main measures.

The share of cooperatives in agricultural production is far behind the world average, which makes planning difficult, reduces productivity and makes it difficult for producers to participate effectively in the agricultural value chain. Modeling and popularizing successful cooperatives in the world and in the country, supporting producers and industrialists who cooperate with them financially will contribute to the solution of the structural problems of the cooperatives. It is recommended to support contractual cultivation practices and clusters within the scope of developing cooperation.

It seems that one of the main problems in agriculture and animal husbandry is inefficiency. It is thought that productivity and supply of agricultural products can be increased by bringing together dry farming areas with water, using modern, controlled irrigation methods such as drip irrigation, supporting advanced technologies (such as vertical agriculture), increasing land consolidation activities, decreasing the amount of fallow land by alternating planting.

Increasing business scales in livestock enterprises, breeding development studies, dissemination of Livestock OIZs, improvement of pastures can provide improvement in this industry. With the definition of "Calf Program", it is suggested to solve the problems of low "fertility/calving rate" and high "calf mortality", which are among the important problems of the industry, by raising awareness and expanding veterinary services.

Agricultural producers use the methods they are used to and avoid applying scientific methods suggested by experts because of the concern that they will lose income despite the recommendations of the experts. In order to support the solution of this problem, it would be appropriate to develop an income/harvest insurance model.

In order to increase productivity in the food industry, it is recommended to support the capacity increase of small-scale meat and dairy facilities, to spread Food OIZs, to give support to strategic areas and to prefer models that will encourage cooperation in support. It has been proposed to establish and support collaborations to contribute to increase added value, and to encourage focused R&D projects and investments in strategic products and technologies.

Establishing e-commerce applications, smart/digital logistics centers, establishing food banks and using these points as logistics centers in times of crisis to provide access to the market, providing food supply to those in need, and designing and establishing neighborhood bazaars that reduce the risk of contamination during crisis periods are recommended. Establishing foreign trade intelligence centers in the regions and supporting national and/or private sector trade centers abroad will contribute to access to foreign markets. It has also been proposed to support investors who will use Turkish products abroad by developing a Turkish Cuisine model to increase food exports. Virtual fairs to be established across the country or regionally will also make significant contributions to the development of exports.

It is important to establish One-Stop Shops (SME Support Offices) for SMEs to access the services (test/analysis, training, consultancy, financial support, etc.) or access information to these services from a single point. It would be appropriate to provide training in foreign trade and branding, which is one of the weaknesses of SMEs. It is recommended to support informative and promotional activities about Geographical Indication, whose importance in society is insufficiently understood.

It is recommended to develop models by taking successful examples into consideration in vocational education institutions, to increase the weight of applied education and to be implemented in the schools allocated by the Ministry of National Education to Chambers of Industry. It is important to consider applied program in undergraduate and graduate education. It has been proposed to establish Farmers' Training Institutes for the training of agricultural producers and to encourage the participants. Employees should be kept up to date with the training to be provided at Continuing Education Centers.

The acquisition of digital technologies to companies is one of the most important concepts of today. It is considered that TR61 Region is a suitable region for Smart Agriculture (Agriculture 4.0) and it would be beneficial to establish a Model Agricultural Facility in this region.

Among financial measures, the establishment of a crisis fund has been proposed. In order not to cause a social crisis, it is important to compensate those negatively affected during crisis periods and to finance the strategically important workforce. It is suggested that agricultural supports should be designed in a way that encourages efficiency and cooperation. Providing financial management training for producers and business owners will contribute to the elimination of knowledge deficiencies on this subject.

As a measure to decrease the population working in agricultural production due to migration from rural to urban areas, the level of social life in rural areas should be increased. It is recommended to increase the number of village schools, establish sports and social facilities, and provide financial support directly or indirectly (eg financial support for social security premiums) to those engaged in agricultural activities.

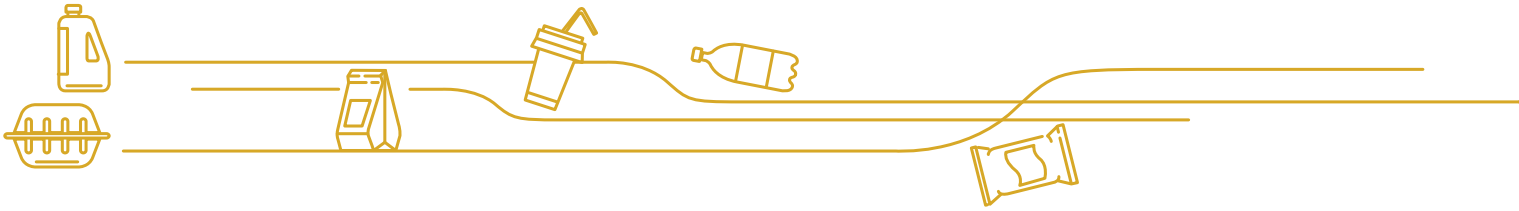
Regarding Food Safety, it is recommended to make HACCP implementation mandatory in food processing companies, to enrich the inspection infrastructure, and to support consumer awareness and information activities.

In order to ensure social equality, it has been proposed to increase financial support by making positive discrimination for women and disabled people and to design micro-credit programs.

In order to prevent water waste in agricultural irrigation, with the transition to closed transportation systems, pressurized irrigation systems and supporting labor in pressurized irrigation, it is important to determine the cost of water according to the amount of water used rather than the scale of the irrigated land. Increasing the inspections of industrial wastewater, industrial and domestic wastewater recovery projects, renovation of drinking water distribution channels with high loss rates, establishment of underground dams are presented as water management measures.

Water needs to be transported through closed conduits to reduce water loss across the country. The application of pressurized modern irrigation systems such as drip irrigation will both increase water efficiency and increase production efficiency with controlled irrigation; in this way, it will be possible to prevent problems such as erosion, salinization in the soil, transfer of fertilizer and pesticide residues to dam lakes. Since there is no effluent treatment plant in the region, the dam lakes are polluted and ecology is damaged. The waste treatment plant is of great importance for the region.

Training to prevent the excessive use of pesticides and fertilizers by farmers and the use of income/harvest insurance mechanisms will also support the protection of ecology. Measures aimed at improving the structure of agricultural lands such as increasing organic matter also gain importance in the protection of ecology and productivity increase. A pelletizing plant has been established for the treatment of agricultural wastes in the region. Biogas/biomass plant and compost production plant investments should also be considered in order to utilize waste for electricity generation.



It is recommended to extend the support of inefficient motors to adapt to climate change, and to provide management consultancy support for energy efficiency studies. In addition, it would be appropriate to establish a Climate Change Adaptation Fund aimed at supporting the projects developed to adapt to Green Deal guidelines and climate change.

Projects aimed at reducing food losses, both for the transportation of agricultural products and for the establishment of cold chains for the transportation of food products should be supported. It would be appropriate to continue supporting licensed warehouses. It will be possible to reduce food losses in markets by transferring fruit and vegetable products in supermarkets, whose expiry date is approaching and cannot be sold during the day, to food banks.

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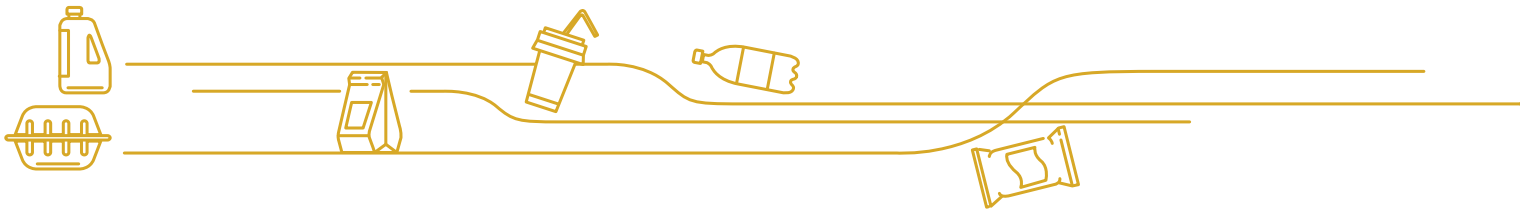

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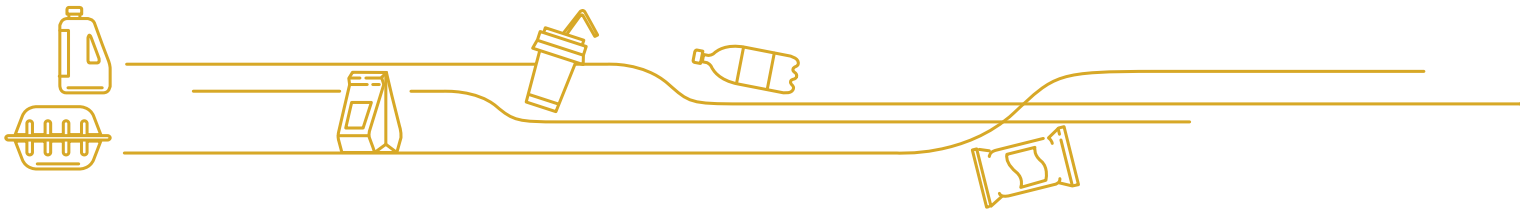

Annexes:

Annex 1: Data on Added Value and Analysis with Factor Cost for Food Production Industry

		ADDED VALUE (USD)			Added Value Per Employee (USD)				
CODE NACE Rev. 2	Section, group and class	2010	2018	Rate of change (2010-2018)	2010	2018	Rate of change (2010-2018)	Index 2010	Index 2018
10	Manufacture of Food Products	7.747.389.721	9.288.642.454	19,9%	21.911	18.037	-18%	100	100
10.1	Processing and storage of meat and manufacture of meat products	941.107.533	684.935.377	-27,2%	29.637	14.120	-52%	135	78
10.11	Processing and storage of meat	126.752.907			22.198	0		101	
10.12	Processing and storage of poultry meat	675.805.651	456.248.308	-32,5%	32.979	15.295	-54%	151	85
10.13	Manufacture of products made from meat and poultry meat	138.548.975			24.950	0		114	
10.2	Fish, crustaceans and mollusks processing and storage	130.351.433	344.362.711	164,2%	27.061	38.102	41%	124	211
10.20	Fish, crustaceans and mollusks processing and storage	130.351.433	344.362.711	164,2%	27.061	38.102	41%	124	211
10.3	Processing and storage of vegetables and fruits	747.549.110	1.419.055.546	89,8%	17.091	21.249	24%	78	118
10.31	Potato processing and storage	28.528.021	71.811.570	151,7%	28.962	37.344	29%	132	207
10.32	Vegetable and fruit juice production	118.482.729	251.752.382	112,5%	28.359	42.895	51%	129	238
10.39	Processing and storage of fruits and vegetables not classified elsewhere	600.538.361	1.095.491.595	82,4%	15.567	18.570	19%	71	103
10.4	Manufacture of vegetable and animal oils and fats	400.352.975	548.032.032	36,9%	30.872	36.284	18%	141	201
10.41	Oil and fat manufacturing		472.066.443			33.303			185
10.42	Manufacture of margarine and similar edible fats		75.965.588			81.771			453
10.5	Manufacture of dairy products	990.450.716	1.169.600.305	18,1%	30.350	23.892	-21%	139	132
10.51	Dairy management and cheese production				0	0			
10.52	Ice cream manufacture				0	0			
10.6	Manufacture of ground grain products, starch and starch products	655.741.041	704.692.261	7,5%	26.820	26.017	-3%	122	144
10.61	Manufacture of ground grains and vegetable products	564.464.017	585.443.607	3,7%	24.196	23.252	-4%	110	129
10.62	Manufacture of starch and starch products	91.277.023	119.248.654	30,6%	81.425	62.499	-23%	372	347
10.7	Manufacture of bakery and bakery products	1.424.231.729	1.810.150.705	27,1%	11.109	8.874	-20%	51	49
10.71	Bread, fresh pastry products and fresh cake production	886.204.950	973.578.709	9,9%	8.324	5.945	-29%	38	33

10.72	Rusks and biscuits production; durable pastry products and durable cake production	456.726.630	662.409.852	45,0%	24.217	18.656	-23%	111	103
10.73	Manufacture of pasta, noodles, couscous and similar bakery products	81.300.149	174.162.143	114,2%	28.171	37.040	31%	129	205
10.8	Manufacture of other foodstuffs	2.167.832.129	2.087.402.511	-3,7%	33.815	25.606	-24%	154	142
10.81	Sugar manufacture	902.975.254	544.083.042	-39,7%	47.126	36.311	-23%	215	201
10.82	Manufacture of cocoa, chocolate and confectionery	473.854.935	672.434.539	41,9%	24.297	24.390	0%	111	135
10.83	Processing of coffee and tea	440.752.235	359.251.121	-18,5%	29.173	20.544	-30%	133	114
10.84	Manufacture of spices, sauces, vinegar and other seasonings	102.995.461	168.619.766	63,7%	24.741	25.898	5%	113	144
10.85	Manufacture of ready meals	15.971.467	85.607.148	436,0%	10.843	12.567	16%	49	70
10.86	Homogenized food preparations and dietetic food manufacturing	5.579.103	5.379.154	-3,6%	23.640	18.173	-23%	108	101
10.89	Manufacture of other foodstuffs not elsewhere classified	225.703.675	252.027.742	11,7%	50.561	32.061	-37%	231	178
10.9	Manufacture of ready animal feeds	289.773.055	520.411.005	79,6%	26.553	37.191	40%	121	206
10.91	Manufacture of ready-made feed for farm animals	283.654.077	511.127.905	80,2%	26.421	37.867	43%	121	210
10.92	Manufacture of prepared food for pets	6.118.979	9.283.100	51,7%	34.571	18.754	-46%	158	104

Source: *Calculated on the basis of TURKSTAT data*

Annex 2: TR21 Region – Food Sector Focus Group Meeting Participants List

Name Surname	Institution	Title
Orhan Onur Aşkın, Dr.	Kırklareli University Food Control Research and Application Center	Manager
İbrahim Toruk	Thrace Seeders Association	President
Birol Tarar	Trakya Tohum A.Ş.	Board Member
Tevfik Yaman	Yaman Peynircilik Business Owner	Business Owner
Burak İnceten	Hayabolu İnceten Farm	Business Owner
Fatih Konukçu, Prof. Dr.	Namik Kemal University	Faculty Member
Kemal Kılıç	Edirne Chamber of Commerce and Industry	Council member
Kamil Yaman	Tekirdağ Agriculture and Forestry Provincial Directorate, Feed Branch	Branch manager
Onur Karakurt	Ministry of Industry and Technology	Expert
Elif Taş Öztüfekçi Trakya	Thrace Development Agency	Expert
Tamer Öztin	UNDP Turkey	Fragile Sector Analysis - Team Leader
Salim Tahhan	UNDP Turkey	Fragile Sector Analysis - Food Sector Specialist

Annex 3: Statistical Data Sources

Source	Data
WTO	• Agri-Food products world import-export data (SITC classification)
World Bank	• Agri-Food products world import-export data (According to countries) • Urbanization ratio – According to countries
FAO	• Yield in crops – According to countries • Land areas – According to countries • Population data – According to countries
INTRACEN	• Agri-Food products world import-export data (HS Code classification) • Selected Agri-Food products Turkey import-export data (HS Code classification)
SSI	• The number of workplaces and insured employees by sectors - Turkey, Area
TSI	• The share of sectors in manufacturing industry • Food and Manufacture Sectors Endorsement, Factor Cost and Added Value amounts • Food and Manufacturing Sectors, Number of Enterprises and Employees, Enterprise Sizes • Herbal and Animal Products, Fish and Aquaculture Production Amounts • Agri-Food Products Import-Export Amounts according to Economic Classes • Agri-Food Products Import-Export Amounts (According to Economic Activity Branches) • Agri-Food Products Import-Export Amounts (HS Code Classification) - Turkey, Area • Population Data • Gross Domestic Product per Capita • Cultivated Area, Current Output and Yield Data in Selected Herbal Products • Production, Cultivated Area and Import Amounts in Cereal and Other Herbal Products • Employment according to economic activity branches and gender • Sizes and shares of animal enterprises

COVID-19 Crisis Response and Resilience Project

FOOD INDUSTRY ANALYSIS REPORT AND GUIDE

TR21 REGION