



Food Security

The Present and Future of
Our Food

TSKB Economic Research

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Food Security: The Present and Future of Our Food

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EU : European Union

WB : World Bank

DSİ: State Hydraulic Works of Turkey

FAO : United Nations Food and Agriculture Organization

IPC/CH : Integrated Food Security Phase Classification

IPCC : Intergovernmental Panel on Climate Change

IFPRI : International Food Policy Research Institute

OECD : Organisation for Economic Cooperation and Development

Food Security: The Present and Future of Our Food

Each of the food products we consume on our tables every day has a story, and we witness only a small snippet of this story. In the long journey of food, from its production to its consumption, from its packaging to its storage and its return to nature as waste, many actors come into play and form the "food system". This system, which appears to run seamlessly like a well-oiled machine from the outside, actually is comprised of many vulnerabilities.

The COVID-19 pandemic, which has wrought economic damage as a result of the lockdowns imposed in both developed and developing countries, attracted attention not only to the difficulty in providing adequate and fair provision of health services, but also to the sensitivity of the international food supply chain to health crises. The issue of domestic production and the safe supply of food has gained importance on the agenda of policy makers, especially as international trade in some products grinds to a standstill. On the other hand, we observe the signs of global warming, an increased frequency of extreme weather events and imbalances in rainfall as the direct effects of climate change. We are reminded of the effects of the climate crisis on natural resources, the loss of yields in agricultural production and the consequent threats to the future of food. However, the "hunger crisis" that has emerged in the world's low-income economies is expected to affect more people in the coming period in parallel with the climate crisis and population growth.

While all of the developments mentioned above draw the public's attention to the issue of food security, we should take a moment to examine the vulnerabilities in the food system more closely and to carry out investment decisions by considering these vulnerabilities. In this context, in the following parts of the study, we discuss the definition of food security, the methodology to measure food security and the current situation of food security in Turkey and around the world. On the other hand, we also examine the points where food security interacts with development themes such as the climate crisis, gender equality, water, land and tackling hunger and poverty. We also discuss policy steps towards food security in the world and in Turkey, especially the Farm to Fork Strategy.

What is Food Security?

The efforts to define food security with its breadth of different aspects are united in the definition of the United Nations World Food Security Committee in its most general form. Food security exists:

“when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”¹

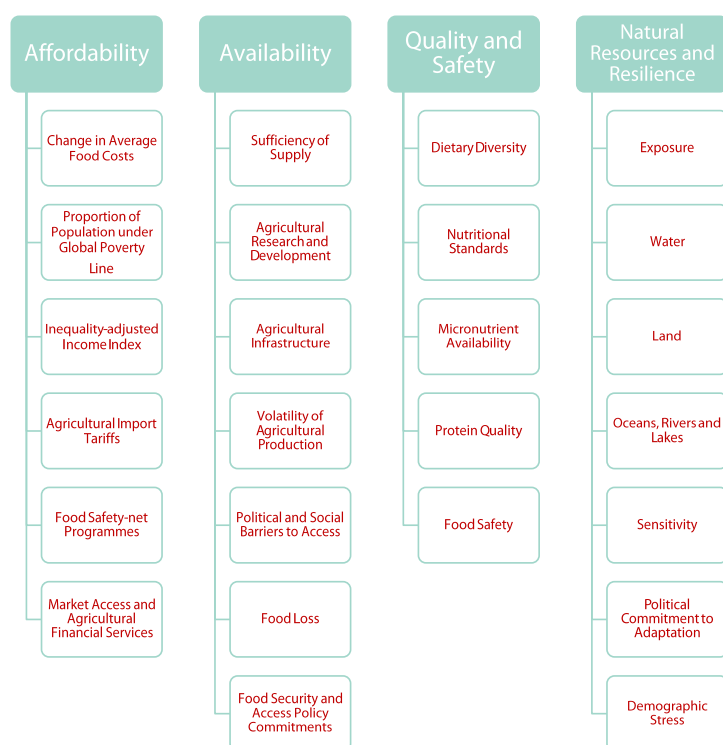
Table 1. Core Categories of Food Security

Category Name	Category Definition
Availability	Availability is related to the “supply” side of food security, covering the level of food production, stock levels and the net trade balance.
Economic and Physical Access	Category that examines the factors such as income, spending, markets and prices, given the importance of access to sufficient food as well as the availability of food.
Utilization	Utilization refers to the nutritional aspect of food. It can be summarized as the equal distribution of food consumption among household members, which includes a variety of foods that are rich in nutrients and of a quantity where all people can gain sufficient calories.
Stability	Food security can be affected by changes in climate as well as by economic or political factors periodically. As a result, the fulfilment of the criteria in the three categories above and the preservation of this situation over time depends on the stability of food security.

The current status of countries in food security can be determined through four main categories: the availability of food, economic and physical access to food, usage of food, and the stability of these three categories over time. It is possible to detail these categories as in Table 1.

Source: Food and Agriculture Organization (2008), TSKB Economic Research

Figure 1. The Food Security Index Methodology



Source: Economic Intelligence Unit, TSKB Economic Research

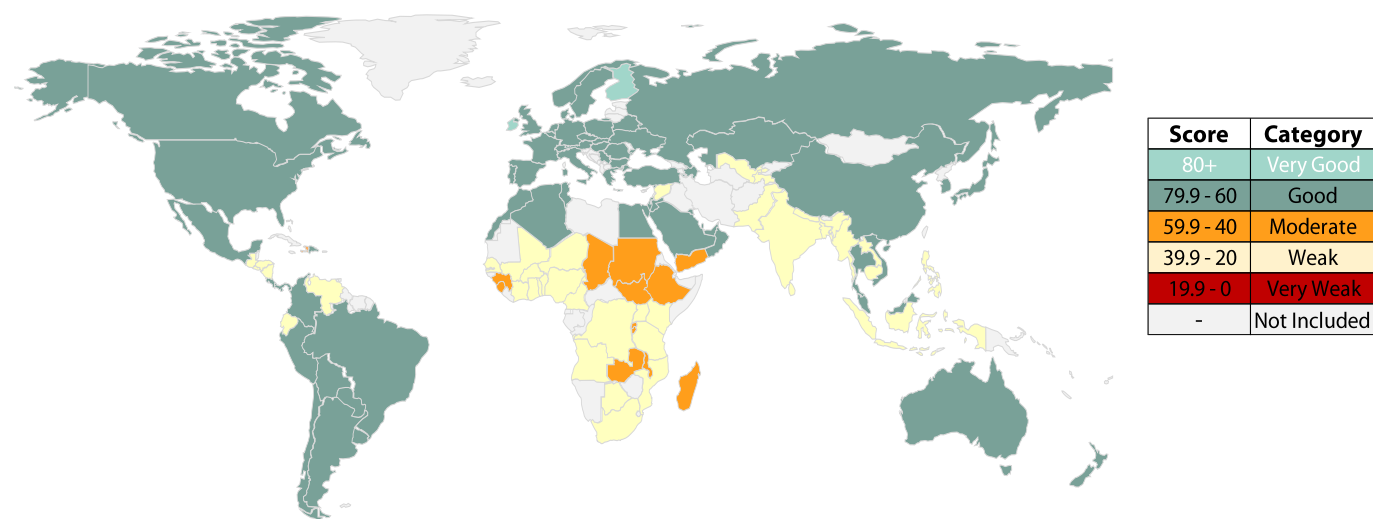
The Economist's Global Food Security Index provides the opportunity to compare the food security, defined by the United Nations, among 113 countries through a novel methodology which can be evaluated with numerical data. The food security index was calculated in 3 categories - Affordability, Availability and Quality and Safety - until 2020, when it added the category of “Natural Resources and Resilience”. With this change in method, the effect of climate change, the risks posed by extreme climate events on countries’ natural resources, and the steps taken by countries to combat these risks can be considered among the factors which may affect the current situation in terms of food security (Figure 1).

¹ On the other hand, the concept of food safety is defined in the Regulation on the Inspection and Control of Food Safety and Quality published in Issue 27009 of the Official Gazette dated on 26 September 2008 in Turkey. Food safety is defined as “the set of measures taken to eliminate all kinds of hazards that may occur in foods including those of a physical, chemical and biological nature. These measures aim to ensure that food does not contain or come into contact with microbiological threats such as allergens, bacteria, viruses or toxins, which are harmful to human health, in the supply chain from production to consumption. Therefore, although “food safety” and “food security” are interrelated, they refer to two different concepts.

Global Outlook for Food Security

The Global Food Security Index, published by the Economist, describes the current situation of food security around the world and enables a comparison between countries and grades the food security score of countries in 5 categories on the levels of “very good”, “good”, “moderate”, “weak” and “very weak”.

Figure 2. Results of the Food Security Index (2020)



Source: Economic Intelligence Unit, TSKB Economic Research

According to the map depicting these categories, 62 countries of the world are classified in the "good" category, while only two countries - Finland and Ireland - are in the "very good" category. On the other hand, no country’s food security outlook is graded as "very weak".

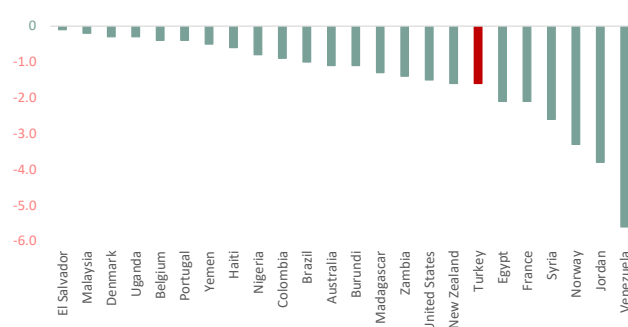
When the countries graded in the “good”, “moderate” and “weak” categories are compared with each other, the economic and geographical differences become more evident. 16 out of the 18 European Union (EU) member states included in the index calculation are in the "good" category with two in the "very good" categories, while 2 out of the 29 Organisation for Economic Cooperation and Development (OECD) member countries are graded in the "very good" and 27 in the "good" categories. On the other hand, 10 out of the 12 countries with a "weak" outlook in food security are located in Sub-Saharan Africa, and these are the same countries considered to be among low-income countries according to the World Bank's classification.



Global Outlook for Food Security

In terms of their historical development, 89 out of the 113 countries under study have achieved progress in the field of food security since 2012, when the index started to be published. On the other hand, the countries with a decreasing score are economically differentiated from each other; developed economies such as the United States of America (USA), Denmark, Belgium and Portugal demonstrate a worsening outlook in the field of food security, along with countries experiencing civil war such as Yemen and Syria, and countries in an economic crisis such as Venezuela (Graph 1).

Graph 1. Change in the food security index (selected countries)



Source: Economic Intelligence Unit, TSKB Economic Research

The fact that 12 out of the 27 Sub-Saharan African countries included in the list have exhibited a worsening food security outlook in the 8-year period between 2012 and 2020, while 10 of these countries currently exhibit a weak outlook, would indicate that the African continent is a region becoming more fragile in terms of food security. However, the climate change induced fluctuations in rainfall regimes and rising temperatures which are being observed across the world are among the dangers which can spread existing vulnerabilities in food security of African region to other parts of the world.

Food insecurity is defined as a lack of secure access to a sufficient amount of safe and nutritious food for human growth and development and an active and healthy life (GNAF & FSIN, 2020). According to this definition, in order to be able to conclude that access to food is secure, this access must be provided both regularly and in sufficient quantity and variety.

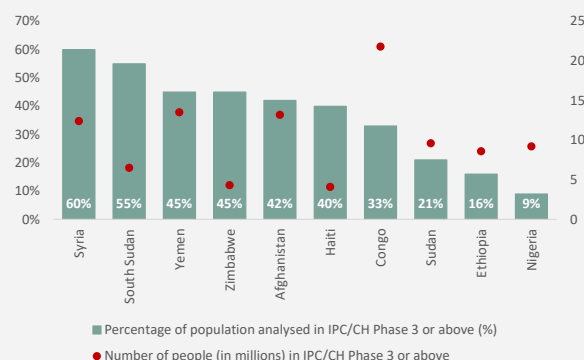
Under the Integrated Food Security Phase Classification (IPC/CH) method, which is used to identify the societies and countries experiencing food insecurity, those in the IPC/CH 3 category or higher are considered among households experiencing a food crisis. These groups also constitute the households in need of urgent intervention regarding food supply (Table 2).

Table 2. Food insecurity categorization according to the IPC/CH methodology

Phase	Technical Definition	Priority Areas of Intervention
IPC/CH 1 Minimal	Households are able to meet their food and non-food needs without resorting to unconventional or unsustainable strategies to obtain food and income.	Building resilience and mitigating disaster risk
IPC/CH 2 Under Stress	While households are able to consume sufficient food, they obtain the necessary income for non-food expenditures through unsafe ways.	Disaster risk reduction and protecting livelihoods
IPC/CH 3 Crisis	Household; <ul style="list-style-type: none"> Experiences a greater than usual nutritional deficiency with the cuts in food consumption, or Has to sacrifice its main source of livelihood to meet its minimum food needs. 	To protect livelihoods and prevent cuts in food consumption EMERGENCY RESPONSE NEEDED
IPC/CH 4 Emergency	Household; <ul style="list-style-type: none"> In parallel with the cuts in food consumption, the household faces acute malnutrition and related deaths, OR, The household uses emergency livelihood strategies to meet its food consumption. 	To protect life and livelihoods EMERGENCY RESPONSE NEEDED
IPC/CH 5 Destruction/Famine	The household experiences extreme food deprivation, resulting in hunger, death, poverty and acute vulnerability at a critical level.	To reverse the rising death tolls EMERGENCY RESPONSE NEEDED

According to the Global Report on Food Crisis 2021, 155 million people in 55 countries around the world were classified in the IPC/CH 3 or higher categories in 2020, and therefore were classed among the households in need of urgent intervention (GNAF & FSIN, 2021). Delving deeper into the data, it is found that 64% of the 155.3 million people in the hunger crisis are unable to access sufficient food due to economic shocks, 26% due to civil conflict and 10% due to weather extremes. Analysed on a country basis, Congo, Yemen and Afghanistan are the three countries most affected by food crisis, accounting for 31% of the 155 million people experiencing food crisis around the world (Graph 2).

Graph 2. Top 10 Countries with the Highest Level of Food Crisis (2020)



Source: Global Network Against Food Crises, Food Security Information Network, 2021, TSKB Economic Research

Another study on the projection of the number of undernourished people around the world predicts that the ratio of undernourished people in the total population will rise from 8.9% in 2019 (FAO(a), 2020) to 9.8% by 2030. As the figures show, food security will be one of the policy areas to gain significant importance in the coming period.

The Current Outlook of Food Security in Turkey

While Turkey ranks 43rd among the 113 countries included in the study in terms of food security, it underperforms the OECD average in all sub-categories. Turkey ranks 3rd place from the bottom (after Serbia and Ukraine) among the countries in the European region, and 7th among the 15 countries included in the study from the Middle East and North Africa.

In terms of subcategories, Turkey ranks 65th in terms of affordability, 24th in terms of access, 43rd in terms of quality and safety and 53rd in terms of natural resources and resilience. The quality and safety sub-index was the area to contribute the most to Turkey's general index score, with 78 points, with the natural resources and resilience category providing the lowest contribution, of 47.4 points.

Graph 3. Food Security Index



Source: Economic Intelligence Unit, TSKB Economic Research

When we look at the details of the food security scorecard, Turkey receives a "fairly weak" outlook in only 3 out of the 25 sub-topics, with two of the three topics of "Agricultural Import Tariffs", "Water" and "Oceans, Rivers and Lakes" referring to Turkey's water outlook. It is noteworthy that Turkey was found to outperform the average in all categories regarding food quality and safety. On the other hand, Turkey was ranked below average in the categories of fluctuations in food prices, food losses and policy steps towards adaptation, with room for improvement in these areas (Figure 3).

Figure 3. Turkey's Food Security Scorecard* (2020)



Source: Economic Intelligence Unit, TSKB Economic Research

* In the circular display, the red colour represents the values below the mean and the green colour represents the values above the mean. The diameter of the circle represents how much below or above the average the country score is.

Food Security in the Nexus of Development Themes

1- Climate Crisis

The climate crisis has intensified concerns regarding the future of the human race. According to the 6th Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC), the planet's surface temperature was calculated as 1.09°C higher in the 2011-2020 period than in the 1850-1900 period. According to forecasts, the increase in global temperatures is expected to reach 1.5°C by the early 2030s and 2°C by the early 2040s in the base case scenario. The report warns that climate change induced extreme weather events will be seen "more frequently and more severely" in the coming period. It also draws attention to the thinning of the seasonal snow cover due to the warming atmosphere, the increasing frequency of heat waves in the seas, and the serious dangers on marine ecosystems as a result of acidification in the oceans.

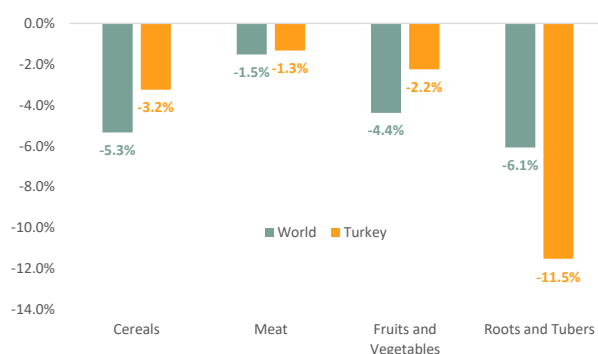
The devastating effects of the climate crisis risks triggering a decline in yields of basic agricultural products. According to a study conducted by the International Food Policy Research Institute (IFPRI) on the impact of the climate crisis on agricultural products, annual per capita food consumption in the world is set to reach 546 kilograms (kg) by 2050 (IFPRI, 2019) - 4.6% lower than in a scenario which strips out the effects of climate change. In other words, it is estimated that per capita food consumption in the world will decline by 4.6% due to the impact of the climate crisis.

A similar picture can be observed in Turkey. It is estimated that per capita consumption of cereals in Turkey will be 196 kg in 2050, with fruits and vegetables consumption of 367 kg per annum and meat consumption of 38 kg per annum – respectively 3.2%, 2.2% and 1.3% lower than if the effects of the climate crisis are removed. (Graph 4).

Although the climate crisis is expected to lead to a loss of yield in agricultural products, the production and consumption of agricultural and animal products also exacerbates the climate crisis. Emissions from agricultural production and land use in the world constitute 18% of total greenhouse gas emissions (Graph 5).

However, academic studies find that food consumption and food waste are also key drivers of emissions, along with food production. About a quarter of the emissions from the production and consumption of food originate from food which has spoiled while passing through the supply chain or has been disposed of by consumers. Accordingly, it is estimated that food waste accounts for 6% of global emissions (J. & Nemecek, 2018).

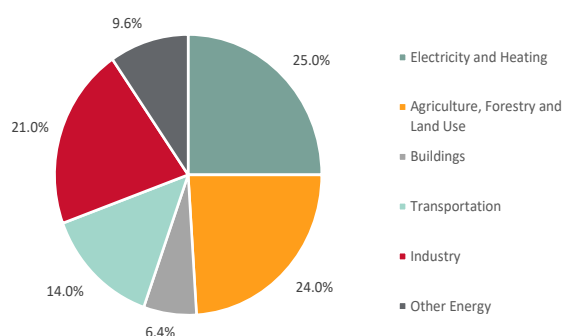
Graph 4. The Impact of the Climate Crisis on Per Capita Food Consumption* (% , 2050)



Source: International Food Policy Research Institute, TSKB Economic Research

*Compared to a scenario where there is no climate crisis

Graph 5. Greenhouse Gas Emissions by Industry (% , 2014)



Source: The Intergovernmental Panel on Climate Change, TSKB Economic Research

2- Gender Equality

It is important to support sustainable agricultural practices in order to increase the resilience of agricultural products against the effects of the climate crisis and to ensure food security for a growing population by using resources more efficiently. According to the FAO, sustainable agriculture and food systems are positioned around five core principles:

1. Increasing productivity, employment and value-added in food systems
2. Protect and enhance natural resources
3. Improving livelihoods and foster inclusive economic growth
4. Enhancing the resilience of people, communities and ecosystems
5. Adapt governance to new challenges.



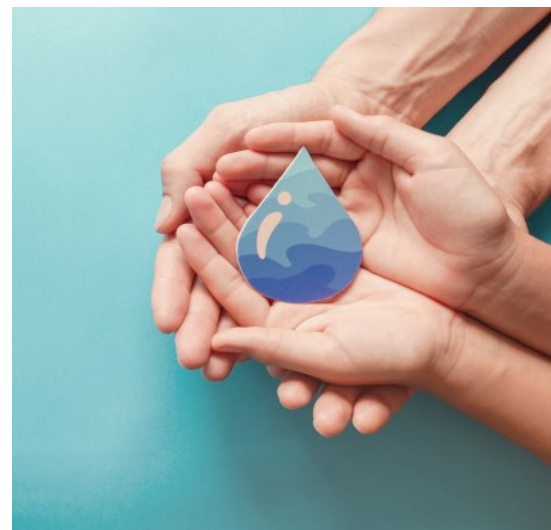
In the context of the above principles, sustainable agricultural production is at a point which cannot be separated from the perspective of gender equality in terms of supporting inclusive employment in agriculture sector. According to statistics by World Bank, 25% of female workers are employed in agriculture sector. Analysed on the basis of country groups, agricultural activities is the primary source of livelihood for 79% of women in the lowest income countries (FAO(b), 2020). However, women producers have very limited access to key production factors such as farmland and capital, hiring workers, purchasing inputs and marketing for their products (Razavi, 2009). On the other hand, it is found that where women have equal access to agricultural production factors with men, female workers are able to increase the agricultural harvest by 20-30%. They also manage to increase the agricultural production of developing countries by 2.5-4% (Asian Development Bank; FAO, 2013). According to the results of the same study, such an increase in agricultural production by women would contribute to a decrease of 12-17% in the number of people suffering from hunger in the world.

Although female labour plays an important role in agricultural activity, women are 13% more likely than men to experience food insecurity in the world. Moreover, the gender gap in food insecurity is wider among the poorer and less educated segments of the society (Broussard, 2019).

Surveys reveal that women's share of food among household members decreases more than for men, especially during the periods of high food prices (FAO(c), 2014). Similarly, the share of food consumption in total income is higher among female-headed households, indicating a scarcity of financial resources for non-food expenditures in families where women are single parents. Ensuring food security can contribute to the economic empowerment of women by enabling women to allocate more resources to non-food expenditures by ensuring economic access to food.

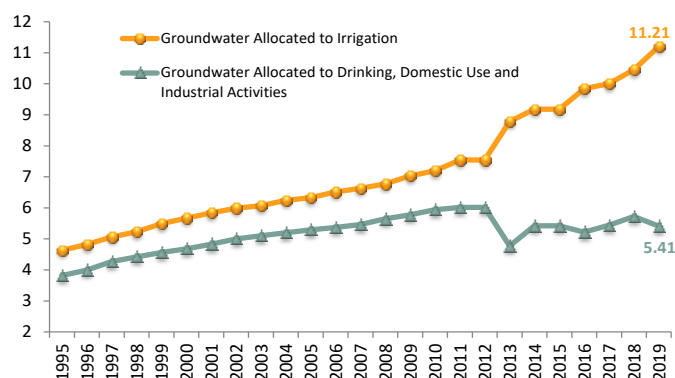
3- Water and Land

Agricultural production is directly related to the use of water resources. Considering the water used in agricultural production within the scope of food security, the first thing that comes to mind is irrigation water. However, surface water, precipitation and soil moisture also play an important role in agricultural production. These factors, used in different proportions during the production phase are differentiated from each other under the names of **green water**, **blue water** and **grey water**. Accordingly, the green water footprint represents the total rainwater used in the production of a product, the blue water footprint represents the total surface and ground water used in the production, and the grey water represents the polluted water resulting from production activities (Water FootPrint Network). According to Mekonnen and Hoekstra study (2010), while it requires 15,415 m³ of water to produce 1 tonne of red meat, 94% of this water consists of green water, 4% of blue water and 2% of grey water.



The study by Rosegrant and others (2009) reveals that the total volume of green and blue water used in food production would increase by 0.7% each year since 2000, from 6,400 km³ annually to a projected 8,600 km³ by 2025 and 9,060 km³ in 2050. On the other hand, Hoekstra others (2012) observed water scarcity in at least one month of each year during 1998-2005 in 201 different river beds examined as part their study. FAO estimates that in order to meet the food demand of the growing population, global food production will have to increase by 60%, with an increase of 15% in the volume of usable water by 2050. However, it is estimated that 1.8 billion people will live in areas where less than 500 m³ of water is available per capita annually, a level below 'absolute scarcity' by 2025. Two thirds of the world's population is forecasted to live in regions under water stress where per capita consumption of water is expected to be between 500-1,000 m³ annually. Therefore, despite the increasing demand for agricultural production, dwindling water resources present a major risk factor for food security. This risk becomes more apparent when data specific to Turkey is analysed. Turkey stands out as country allocating the highest share of total abstracted freshwater to agricultural irrigation among OECD countries. According to data compiled by Aquastat, 84.9% of the total water withdrawn is used in agricultural irrigation – well above the EU average of 30.9%.

Graph 6. Amount of Groundwater Allocated to the Drinking and Domestic Use, Industry and Irrigation (km³/year)



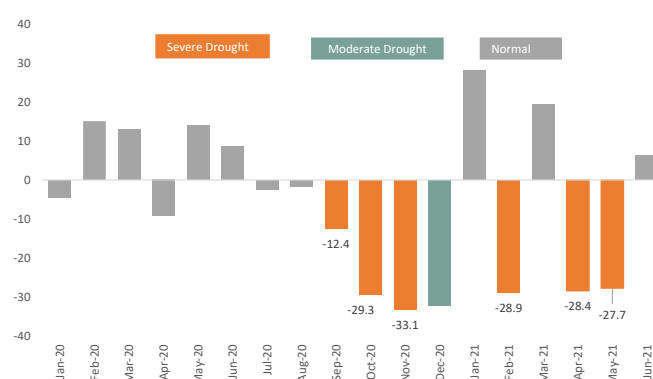
Source: State Hydraulic Works, TSKB Economic Research

On the other hand, data released by the DSI (the State Hydraulic Works of Turkey) reveals that a significant proportion of Turkey's groundwater and surface water is used for agricultural irrigation in Turkey. The proportion of groundwater allocated to irrigation grew from 55% in 1995 to 67%* in 2019, while the share of groundwater allocated to drinking water, domestic and industrial purposes decreased from 45% to 33%. Since 2012 in particular, agricultural irrigation has consumed more and more groundwater. However, this poses a danger to the presence of groundwater resources, which function as a reserve which can be drawn upon when there is a lack of water for drinking and domestic purposes.

*This percentage represents solely share of irrigation in total groundwater withdrawn, whereas 84.9% stands for share of irrigation in total water withdrawn (groundwater and surface water resources combined)

Considering rainfall, which is crucial in charging the groundwater supply, average precipitation in 2020 decreased by 14.5% compared to the previous year to 500.1 mm, well below the long-term average of 574 mm and marking the driest year in the last 5 years and the sixth driest in the 40 years since 1981. This year, on the other hand, severe drought was observed in February, April and May in 2021.

Graph 7. Deviation of Monthly Precipitation from Normal (mm)



Source: Turkish State Meteorological Service, TSKB Economic Research

Along with water resources, the amount of arable land, the biodiversity in the soil and the soil moisture can also be considered central to food security as these attributes are closely related to the future of food supply. According to the FAO, 99% of the world's food supply is produced by land-based farming practices. While 37% of the world's land is used for agriculture, 33% of the land on our planet has been destroyed as a result of desertification. It is noted that landslides could slash crop yields in half, while the economic loss due to deforestation and erosion could range from EUR 1.5 to 3.4 trillion per year (The ELD Initiative - The Economics of Land Degradation Initiative, 2015).

Soil can also affect food security as a perpetuator of the water cycle. Soil provides efficiency in the production of agricultural products with the moisture it contains. It also helps mitigate the danger of flooding during heavy rains by absorbing water and purifying it from polluted materials by filtering it naturally. Increasing the amount of water stored in the soil contributes to the following;

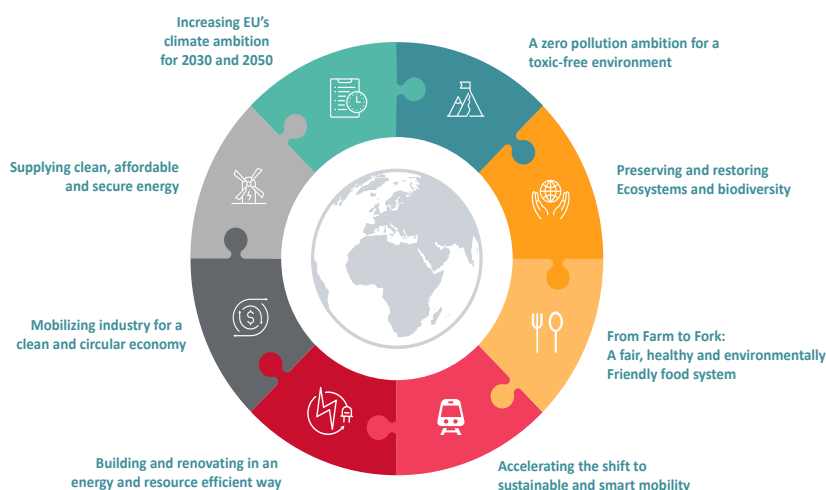
- Increasing yields where the soil is rich in minerals and biodiversity,
- Curbing crop losses caused by drought,
- Recharging underground water resources and thus protecting water levels in the wells,
- Ensuring river levels remain charged (Benites & Castellanos-Navarrete, 2003).

Studies find that smart irrigation systems are among the solutions in tackling the increased threat of drought while noting that those countries which lack the means to develop such irrigation technologies are often those to be geographically most affected by drought, with some of these countries even at risk of acute hunger. (Canales-Ide, Zubelzu, & Rodríguez-Sinobas, 2019; UN Water, 2021). Therefore, positioning the current situation of food security within the perspective of water resources should be one of the priority issues within the financing channels and policy steps, which are aimed at enabling developing countries, especially those in these regions, to manage water resources more efficiently and effectively. As a developing economy, evaluating Turkey's current position in terms of water resources and food security will also help tackle the effects of climate crisis while directing financing to economic development.

Farm to Fork Strategy

One of the most comprehensive policy frameworks planned to be implemented in the world for sustainable production methods of agricultural products and the safe distribution and consumption of food is the European Green Deal, which was adopted by the European Parliament in 2019. With an awareness of the impact of climate crisis on food security, the European Union integrates its policy steps towards being carbon neutral by 2050 within the framework of the "European Green Deal" in order to

Figure 4. Main Action Areas of the European Green Deal



Source: European Commission(a). (2019) ,TSKB Economic Research

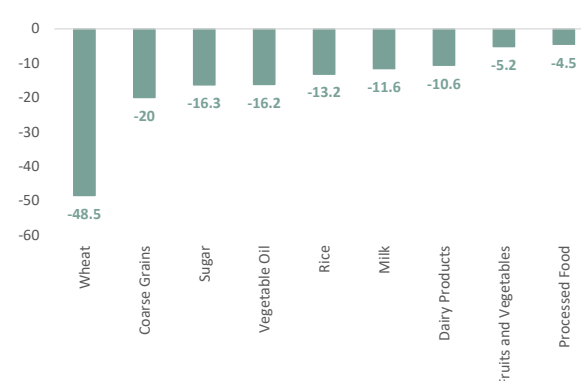
support sustainable, fair and green development while mitigating the effects of climate crisis. In the new order, ambitious objectives are listed on many issues from supplying clean, cheap and safe energy to supporting climate-friendly circular industrial activities and the efficient use of resources. (Figure 4).

The EU, which aims to be carbon neutral by 2050, published a strategy document to cover agriculture and food systems under the name of the "Farm to Fork Strategy". The objectives set out within the scope of the EU's strategy document represent a holistic approach towards cutting emissions in the food and agriculture industry, starting from production technologies and extending to distribution channels and consumer preferences. This strategy will initiate a transformational move which requires optimal use of nature-based, technological, digital and satellite-based solutions. The content of this strategy includes objectives such as transforming production by halving total use of chemical pesticides by 2030, reducing nutrient losses by at least 50% and allocating 25% of the total agricultural land to organic farming.

Although academic literature on the impact of the Farm to Fork Strategy on the EU and global economy have only just begun to emerge, the work carried out so far points to possible reductions in both agricultural production in the EU and its competitiveness in export markets. (Beckman and et al., 2020). The basic premise is that restrictions on the use of agricultural inputs such as pesticides, fertilizers, antimicrobials and other materials may set back technological innovations in agriculture, thereby accelerating a decline in agricultural production, in turn leading to inflation in food prices with possible worsening outcome on welfare.

Production estimates reveal that production of wheat is expected to decrease by 48.5%, with a 13.2% reduction in the production of rice and a 5.2% fall in production of fruit and vegetables in the 8-10 years after the full implementation of the measures. The decline in production levels is also expected to affect exports; if the Farm to Fork Strategy is fully implemented, exports of fruit and vegetables from the EU to the rest of the world would decrease by 5.3%, with exports of rice and coarse grains declining by 82.2% and 34.2% respectively in the course of the next 8-10 years.

Graph 8. Changes in Production in EU Region Under Full Implementation of Farm-to-Fork Strategy (Percentage Change)



Source: Beckman et. al. (2020), TSKB Economic Research

*Within 8-10 years

Recognizing that the transformation of agricultural production systems is an important component in tackling the climate crisis, the European Green Deal requires that at least 40% of the budget allocated to the common agricultural policy of member states for the 2021-2027 period be allocated to efforts to combat climate change. In this context, while agricultural activities aimed at reducing carbon emissions will be rewarded, alternative solutions such as the use of biofertilizers and obtaining energy from biogas will be encouraged.

The EU aims to support the adoption of sustainable and circular business models not only in production but also in packaging and distribution of food products. Many objectives such as the use of environmentally friendly materials in food packaging, conducting work on reformulation in the food industry for the transition from foods which are high in fat, sugars and salt to healthier and more nutritious foods, supporting the use of responsible marketing channels and minimizing food losses by reviewing the stages in the food production line are planned to enter the agenda of EU member states. (European Commission (b), 2020).

Turkey's Policy Agenda for Food Security

The objectives in the 2019-2023 Strategic Plan set out by the Ministry of Agriculture and Forestry are positioned within the scope of 7 main goals. Almost all of these goals include objectives for ensuring food security. Within the scope of the strategy, the following goals are considered among the policy steps to ensure food security:

1. To secure supply of plant-based and animal products,
2. To develop appropriate policy tools for a sustainable agriculture sector,
3. To provide accurate and up-to-date information on food safety,
4. To ensure the protection and efficient use of soil and water resources,
5. To curb the negative effects of flood and drought,
6. To increase the capacity to combat desertification and erosion,
7. To measure the possible effects of climate change on agriculture and to develop suggestions for taking precautions,

On the other hand, in Economic Reforms Action Plan, it is noted that the climate crisis and the disasters, experienced as an extension of this crisis, have "caused the changes in crop planting behaviors, which affect prices in food groups which have a significant weight in the inflation basket". In order to prevent volatility in food prices and to curb its impact on inflation, the government aims to establish an Early Warning System. The actions aimed at the goal of reducing food loss and waste, which are included in the plan, include steps such as selling food products left in the field and the wholesale market on the Digital Agricultural Market (DİTAP), developing the cold chain to prevent vegetable and fruit losses and developing contracted farming mechanisms (Figure 5).

Figure 5. Objectives for the Prevention of Food Loss and Waste in the Economic Reforms Action Plan



Source: Ministry of Treasury and Finance, TSKB Economic Research

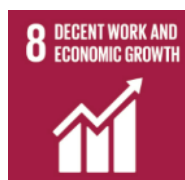
The Ministry of Commerce has put actions such as the efficient use of water resources, limiting soil pollution by reducing the use of pesticides, antimicrobials and chemical fertilizers while maintaining land consolidation registration activities to increase efficiency in land use on its agenda among actions for sustainable agriculture in the Green Deal Action Plan. At the same time, the policy steps proposed in the First Water Council held by the Ministry of Agriculture and Forestry include the reduction of loss and leakage in water transmission, the reuse of wastewater, increasing irrigation efficiency, increasing efficiency in food production and agricultural yield, determining the water footprint and increasing training activities.

When we examine the applications for food packaging, we find that the Regulation on Zero Waste has gained importance within the scope of supporting circular production and consumption systems. The Regulation on Zero Waste aims to reduce waste generation or to prevent waste by using resources more efficiently and to recycle waste in cases where it occurs. The Regulation plays an important role in preserving food with environmentally friendly materials and thus reducing plastic waste resulting from food packaging in our country.

Sustainable Development Goals within the Perspective of Food Security

With the issue of food security intertwined with many development themes such as climate, gender and natural resources, it becomes apparent that the achievement of the Sustainable Development Goals (SDGs) is directly related to ensuring food security. Among these SDGs, goal number 2 of "Zero Hunger" and goal number 6 of "Clean Water and Hygiene" attract attention, while goal number 3 of "Healthy and Quality Life" can be achieved if access to nutritious food and clean water is provided. Efforts to promote sustainable agricultural practices in the context of ensuring food security will contribute to regional economic development and help achieve the 10th goal of "Reducing Inequalities" by helping to reduce the income gap between urban and rural areas through the 8th goal of "Decent Work and Economic Growth".

In addition, supporting sustainable agriculture also plays an important role in supporting the economic empowerment of women, who earn income from agricultural activities in rural areas. On the other hand, the steps to combat climate change, which endangers the future of water resources and threatens to lower agricultural yields, can also be considered under the 13th goal of "Climate Action".



Conclusion

In parallel with technological, sociological and economic developments, the issue of secure and fair access to food is increasingly gaining prominence among development goals as countries seek out their development paths. The United Nations Food and Agriculture Organization celebrates World Food Day on 16th October every year in order to draw the attention of all stakeholders to the issue of food security. Within the scope of the second Sustainable Development Goal of "Zero Hunger", the FAO aims to eliminate the 155 million people currently experiencing acute hunger crisis, by 2030.

In response to the climate crisis, which is one of the biggest threats to food security, policy steps aimed at the green transformation are gaining momentum while the European Green Deal stands out among these policy efforts. Development finance institutions around the world are also seen among the key players responsible for spreading such policy steps to ensure that food is delivered equally to all income groups while preserving its nutrition, because ensuring food security through sustainable policy steps is an issue intertwined with a wide array of development themes not only in tackling hunger, but also when it comes to combating the effects of the climate crisis, ensuring gender equality, promoting the efficient use of water resources and preventing soil degradation. Therefore, providing finance through development finance institutions in areas aimed at increasing food security will help countries achieve progress in food security and in the related Sustainable Development Goals.

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