

2020

POST-PANDEMIC
OPPORTUNITIES
IN TURKEY'S
AGRICULTURE
FOOD & BEVERAGE
SECTORS

DECEMBER

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AGRICULTURE
AGRI-BUSINESS
SECTOR REPORT
SERIES NO:3

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AUTHOR

Güldem Atabay

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PREAMBLE

Egeli & Co., devoted itself to **generating values** for its stakeholders since 2002 - its incorporation - and being an independent and boutique investment group, have been utilizing both traditional and creative new financial products, investing in impact themes and platforms, in Turkey and abroad. Our group, decided to focus on the themes of real property, clean energy, infrastructure and impact investing themes, particularly agriculture so as to create value in the long run for its stakeholders and to provide continuous positive income while aiming consistent capital growth.

Egeli & Co., made the principle of contributing to Turkey's agricultural sector a top priority among the global real asset portfolios with its “Sustainable Responsible Investments” (SRI) approach when making its investments and targets to pioneer in the studies for increase of the agricultural added value and institutionalization in the agriculture. When Egeli & Co. started its agriculture investments around eight years ago it had three key concerns: food security, water security and social impact on rural areas.

In this respect;

- shifting the institutional and individual investments to the agricultural sector to form a sustainable and highly competitive agricultural sector;
- development of domestic development capacity and increase of the business opportunities by agricultural activities being of crucial importance for our national economy;
- optimization of the rural environmental conditions;
- implementation of mechanisms - including risk management - which enable effective utilization of the sources;
- training the labor force required for continuity of quality in agriculture;
- carrying out agricultural production, effectively using the scientific approach and the technology

are the primary objectives of our group.

Our group led, with the aforesaid understanding and approach, two Special Reports on “Agriculture in Turkey” in 2010 and “Turkish Agriculture Beyond 2015: Is There Opportunity for FDI?” in 2015. Our latest Report “**Post-Pandemic Opportunities in Turkey's Agriculture, Food&Beverage Sectors**” is offered as a product of best efforts of our team as well as by **Ms. Güldem Atabay** for evaluation by our business world and representatives of the sector.

In this third visit to Turkey's food sector, we are challenged by the novel coronavirus that has been yielding great human suffering on a global scale, shaking every economy in the world and re-orienting the food value chains across the markets. If COVID-19 was not enough by itself, the climate change has turned more tangible threatening every livelihood across the Earth. Food system participants are at the same time trying to catch up with rapid digitalization of the production systems that manifests as “AgTech revolution”. Looking at how Turkey's agriculture and food sectors are coping with such gigantic challenges in the Report, it is relieving to highlight that Turkey emerged from the COVID-19 shake up without facing any food shortages and remained a net food exporter. Given the natural advantages Turkey has in the food sector, nonetheless, the on-going challenges require investments to bring the full potential out in the years ahead where food security and safety will be a priority for nations. The challenges Turkey's food sector faces also presents major opportunities for both local and foreign investors.

As technology has advanced, we have seen the agriculture industry take a backseat. But it shouldn't be seen this way. Families hand down their farms generation after generation, and farming is a learned skill that many people do not possess. Agriculture is what fuels our Friday night dinner dates, our affinity for home and office decor, and our Sunday night grocery trips. Supporting farms means they do not have to have the threat of a foreclosure from the bank looming over their heads. ***Institutional investment provides both social and monetary capital for farmers to maximize their yields and productivity*** while funding farmers' access to inputs or the equipment they need to make their yields as bountiful as possible. Something else one needs to consider is the “eat clean” and “eat local” movement. People are growing more and more selective in the food that they put in their bodies. At the end this is a clean win-win strategy for everyone involved.

Egeli & Co., starting with a vision to become a leader in all the subjects of activity, would increasingly and continuously support the studies for development of agriculture of our country and increase its share in the economy.

December 2020, Istanbul

TAN EGELİ

Chairman of the Board of Directors

Egeli & Co. Investment Group

GÜLDEM ATABAY



BIOGRAPHY

She is an economist with 26 years of professional experience and currently has a chair in the Executive Board of Egeli & Co. Energy Investments (EGCEY) and a chair in the Executive Board of Egeli & Co. Agri Capital (EGCYO).

She is also a columnist on economy/politics at web based media Ahval News and Paraanaliz.

She was the Director of Research and Strategy at Egeli & Co. Asset Management from September 2014 to January 2016 (A subsidiary of Egeli & Co. Financial Services Group) that provides portfolio management, investment management, risk management and advisory services to local and foreign institutional investors, family offices as well as high net worth individuals.

Previously was the Turkey Economist of UniCredit Menkul Değerler A.Ş. as the Director of the Research Department; the Chief Economist and the Manager of the Research Department at Ekspres Invest; the Economist at Raymond James Securities; and Ege Invest; an Analyst of the Research Department at Global Securities, and Karon Securities. She had her MA in Economics from Hacettepe University, and back at 1995 she was graduated from Middle East Technical University, Management Department.

She is a visiting staff of the Izmir University of Economics; and teaches Turkish Economy at the Department of Management.

She is the mother of a lovely daughter and also runs the family farm producing raisins and grains in the city of Manisa/Saruhanlı located in western Turkey.

EXECUTIVE SUMMARY

This report is a sequel to Egeli & Co's two previous reports focused on Turkey's agribusiness sector. The first issued in 2010 called the "Turkish Agriculture Sector" was written by Dr. Murat Ucer and Atilla Yesilada which was followed five years later by "Turkish Agriculture Beyond 2015: Is There Opportunity for FDI?" with co-writers of Atilla Yesilada and Guldem Atabay.

In Egeli & Co.'s third visit to Turkey's food sector, we are challenged by the novel coronavirus that has been yielding great human suffering on a global scale, shaking the every economy in the world and re-orienting the food value chains across the markets. If COVID-19 was not enough by itself, the climate change has turned more tangible threatening every livelihood across the Earth. Food system participants are at the same time trying to catch up with rapid digitalization of the production systems that manifests as "AgTech revolution" covering farm to fork processes.

Looking at how Turkey's agriculture and food sectors are coping with such gigantic challenges, in Part 1 of the Report, we start by detailing agricultural produce of the country in the last five years and the foreign trade status of the food sector. We outline the drivers of demand for Turkey's food sector and the general economic conditions that have shifted since our 2015 Report.

It is relieving to highlight that Turkey with its vast biodiversity and suitable climatic conditions to produce a wide range of food stuff emerged from the

COVID-19 shake up without facing any food shortages. Yet, economic volatility in the past two years that resulted with significant TL depreciation elevated food price inflation to very high levels. Turkey's lesson from COVID-19 was that even though local production plays a particularly important part in securing food security and export income, it is better to combine such capacity with innovation to produce cheaper food and provide cheaper alternatives to imports.

With the fierce effects of the climate change droughts have increased in frequency and duration in Turkey which will be lasting phenomenon with much impact on Turkey's agricultural practices and production in the years ahead. Decline in arable land continued with losses to urbanization, and degradation of farm land.

While Turkey has not given emergency support to Turkish producers in response to the Covid-19 pandemic; the government nevertheless took measures to smooth the effects of COVID-19 on Turkey. Despite all the challenges Turkey remained able to feed its 83.3 million population, incoming 40 million tourists each year and maintained its net food exporter position.

Turkey's retail food and beverage sector coped with new trends after the pandemic with the online sales booming. Turkey's well-developed food processing sector is producing good quality food items for the Turkish market and to export overseas. The pandemic skyrocketed online sales of major supermarket chains and smaller food and beverage retailers in major cities across Turkey starting with Istanbul, Izmir, Bursa, Ankara and Antalya. Even the hard discounter stores started online ordering

services during the pandemic and local food producers also heavily engaged in online and farm-to-door sales. This trend is expected to continue in the years ahead. Market analysis show while food price inflation is hurting the most vulnerable, the rising online food shopping and rising home-cooking will boost the sales of standalone gourmet/premium food stores located in major city centers like Istanbul, Izmir, Ankara, Bodrum, Antalya, Bursa, Cesme. Demand for higher-value processed food products, specialty meat products or high value food items generally will increase in the medium to long term in Turkey's urban western centers where consumers are relatively wealthier. Farm-to-door or online sales through food retailing platforms that have emerged in the past couple of years have also been a rising trend.

Some “farm-to-door food producers”- especially for meat, milk and their products are also delivering groceries through online sales to a select and dedicated number of wealthy customers in Turkey's big cities. Deliveries are mostly based on certain days of the week for each city.

A free trade deal (FTA) signed between Turkey and the United Kingdom on the last days of 2020, immediately after the U.K. and the European Union compromised on a trade and cooperation agreement to avoid a no-deal Brexit. The agreement is very important for preserving the trade flows between the two countries as trade has grown 70% percent over the last decade, and in 2019 before the COVID-19 restrictions, reached nearly 19 billion pounds. Through the FTA, U.K. and Turkey aims to escalate volume of trade to 21 billion pounds within the next three to four years.

In the second part of the Report, we look at what the future holds for the food sector tackling the challenges COVID-19, climate change and technological advances brought to our lives in irreversible ways.

The world's population at 7.7 billion people and counting, participate in the food system every day. We decide what food we consume, what clothes we wear and what products we use; much of which originate in agriculture. **Agriculture contributes 26% of greenhouse gas emissions, consumes 70% of fresh water, and has caused the loss of 60% of vertebrate biodiversity since the 1970s.** The cost of these negative side effects amounts to USD 12 trillion according to the FAO, outweighing a market value of USD 10 trillion. The planetary food system can be imagined as an overloaded boat becoming increasingly volatile with each additional burden: population growth, climate change, loss of biodiversity, pollution, land degradation and now the pandemic. Hence the future depends on setting a new course for the food system that reduces hunger, creates healthy people and a healthy planet simultaneously.

COVID-19 printed unprecedented scenes to our minds: supermarket shelves stripped by panic buying, livestock wasted because processing plants were closed, ghost like streets, hotels, restaurants, bars in mega cities as consumers limited with the quarantine measures were battling to get deliveries. Suddenly concepts like “food security, self-sufficiency, and better farming practices” became household words. More people began thinking about where their food comes from, how easily it can be disrupted. And exploded a rapid shift to home cooking.

To reduce disruptions, the governments engaged in intensified efforts to reconsider how better to feed their citizens. Just as Covid-19 hit some of the most vulnerable populations around the world, climate change has created an unstable food supply across these same regions for years to come.

COVID-19 has exposed the vulnerabilities of global food production and supply chains, and it has the power to drive some important changes in the agribusiness space. It highlighted the risks of unhealthy diets and the extreme fragility of the global food system.

The pandemic has underscored the urgent need to transform agriculture. The devastation created with COVID-19 hence presents a unique opportunity to adopt long-term measures to promote healthier diets, encourage farmers to produce a wider range of food stuff, and strengthen collaboration among the public-health, food, and agriculture sectors. And the economic reconstruction that will follow it represents a perfect opportunity to reallocate resources and refocus.

The world grows enough food to feed well over 9 billion people, yet one third of it is wasted through pests, harvesting, processing, storage, and transportation, or by simply throwing away uneaten dinners. Hence “sustainability” will be at the heart of the future of agribusiness on a global scale because food production is the main driver of environmental degradation and biodiversity loss while 30% food loss from farm to table also needs to be tackled. The virus could give a boost to automation, local-origin products, reduction in food waste, rise of alternative

proteins and building better distribution channels.

There are three main forces driving the current changes to the way we consume food today:

1. Climate change,
2. Changes in diet and consumer behavior,
3. Technology advancements.

Hence, global food systems must meet a formidable “triple challenge” simultaneously:

1. Provide food security and nutrition to a growing global population that will reach almost 10 billion in 2050 according to the FAO.
2. Contribute to the livelihoods of people around the world working along the food supply chain.
3. Ensure the environmental sustainability of the sector, while adapting to, and helping to mitigate climate change.

Climate change places the food sector under increasing pressure. The UN cautions about a looming food crisis where the challenges facing agriculture and food systems are so stark that to continue with “business as usual” is not an option.

Yet in shaping a different future, seven major challenges facing the agriculture industry and food production should be considered:

1. Environmental factors, such as greenhouse gas (GHG) emissions and scarcity of water.
2. Health concerns, such as pandemics like Swine flu or COVID-19, and the growing resistance to antibiotics in humans.

3. Scarcity of land.
4. Food security and the negative impact of globalization.
5. The already huge - and growing - demand from EM that cannot be met.
6. Food waste.
7. Consumer demand and concerns.

Some of the most dramatic changes to the 12,000-year-old agriculture industry are being tested by technology startups around the world that are coming up with better ways to grow, water, fertilize and harvest crops, and feed and rear animals - or replace them. Hyperconnectivity, the internet of things, augmented reality and collective intelligence systems, combined with reduced costs of implementing new technologies, are transforming entire systems of production, management and governance of the food sector. **Digital technology** drives change on multiple fronts at accelerated rates by collecting, using, and analyzing massive amounts of machine-readable data about practically every aspect of the food system at nearly zero marginal cost.

Breakthrough digital technologies have the potential to deliver significant positive impacts for producers, consumers, and the environment, across food value chains. However, they are not a cure-all. Unleashing the promise of digital to improve food system outcomes will require careful policy-making and complementary investments.

COVID-19 has changed the way people think about, purchase, plan and consume their food. The silver lining during this pandemic has been the rise of various positive trends, particularly around sustainability and health. Lockdown measures may have caused lasting

behavior change in relation to food consumption, marked by substantial shifts in shopping patterns, meal preparation and eating habits.

Notable upward trends for the future include:

- Enjoying food and having a wide variety will matter more post-pandemic.
- Cooking skills and equipment and having time to cook will be more important.
- Accessible food stores and access to food at affordable prices are increased priorities.
- Nutritional knowledge, healthy foods and using food to control weight will matter more.
- People plan to buy more local food and reduce food waste.
- Since the COVID-19 pandemic, people have been paying more attention to how their food is packaged and to the information on the packaging, concerned with hygiene, freshness, additives and sustainability.
- Most pronounced overall is an increased focus on food affordability and value and with this comes the risk of widening inequalities and behavior gaps around healthy and sustainable eating.

The changes in consumers' food demand, globalization of agriculture and climate changes all lead to food price inflation. There has always been cycles in food prices yet the general trend has been on the upwards for the last three decades. Now with COVID-19 this trend seems to be accelerated restraining production in short. Most food commodity prices have gained momentum as end-2020 approaches, driven by supply shortfalls and stronger-than-expected demand in some oils and meals as well as depreciation of the U.S. dollar.

The food price outlook is subject to various risks over the next five years: energy costs, macroeconomic conditions and La Niña.

The biggest postwar period changes to the global agriculture industry are happening right now; from shifts in consumer preferences to technology-enabled productivity improvements to turmoil in domestic and international markets. It is vital for agribusiness stakeholders to factor the changes and the potential disruption that comes with them.

The past ten years have seen unprecedented growth in protein demand across the globe. The next ten years are going to look notably different from the past decade. Next ten years will be an era marked by macroeconomic, demographic, and nutrition-driven-preference shifts presenting threats and opportunities for current industry participants and entrants alike. While aggregate consumption of meat proteins will continue to rise, the growth rate is expected to slow by as much as 50% to 1.0% to 1.5% a year with growth concentrating in isolated regions. Animal-protein-replacement products such as plant-based proteins and synthetic meat are increasingly competing for share of protein consumption in select markets, encouraged especially by consumers' concerns over the environmental impact of livestock production. Producers will have to reconsider whether their operational and investment strategies are aligned with the demand shifts under way as they will be re-positioning their assets to capitalize on demand driven opportunities as the protein demand changes structure.

The retail landscape is being reshaped by structural channel shifts as well with its speed to gain pace in the coming years. A business model battle is under way in retail, with the e-marketplaces emerging as the uncontested leaders. Retailers will be more interested in selecting smaller, high-growth brands and model disruptors. Food may skip the step of stopping at grocery stores and start moving directly from warehouses to household doorsteps when at the same time, people will demand more traceability and independence. A “renaissance in home cooking” will benefit the small farmers, and local grocers with the home cooking resurgence will be a continued expansion of the farm-to-table movement.

In the scope of e-commerce and applications, a megatrend that will shape the way retailers operate will be drones used in food delivery especially in large metropolitan areas and remote regions; autonomous vehicles combined with drones to significantly shorten delivery times; and the emergence of restaurants closed to the public but dedicated to the delivery of finished products. Agri-food tech expected to be a post-pandemic growth industry.

Looking beyond COVID-19, there appears to be four major trends that will greatly influence the direction of the agriculture sector in the coming years for a more resilient future and these will have a flow of effects extending to every corner of the agriculture sector:

- 1.** We will eat differently.
- 2.** We will source from different places.
- 3.** We will produce and trade food differently.

4. We will conduct trade with different rules as governments will support agriculture with different incentives and private sector will keep on investing on change.

The OECD-FAO Agricultural Outlook 2020-29 highlights the need to invest now in building productive, resilient, and sustainable food systems in the face of uncertainties.

The “**European Green Deal**”, as proposed by the European Commission (EC) at the end of 2019, is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.

There comes in the Climate Smart Agriculture (CSA) which is an integrated approach to managing landscapes-cropland, livestock, forests, and fisheries--that address the interlinked challenges of food security and climate change. While production is struggling to keep up as crop yields level off in many parts of the world, the declining ocean health, and natural resources-including soils, water and biodiversity-are stretched dangerously thin. The challenge is intensified by agriculture's extreme vulnerability to climate change.

CSA aims to simultaneously achieve three outcomes:

- 1.** Increased productivity.
- 2.** Enhanced resilience.
- 3.** Reduced emissions.

The last part of the Report -Part 3- is focused on the structural problems in Turkey's food sector and lay out state support schemes for the sector.

Climate change, Paris Agreement, Green Bonds, food waste, digitization in the Turkish agriculture sector and agricultural sustainability in Turkey are also elaborated. In this part of the report, recent developments in Turkey's long-term rural development ambition “GAP - South Eastern Anatolian Project” are also summarized. Finally, Post- Covid-19 Investment Opportunities in Turkey's Food Sector are highlighted.

Turkey's unique geographic and climatic advantages result with a wide range of agricultural production. Yet, unaddressed structural problems have long been a drag on productivity. Such rigidities prevent Turkey from adapting to the challenges in the food systems which will be imposing serious challenges in the coming decades.

The modern agriculture sector state support schemes not only try to boost production but also try to extend its grasp on a wider perspective of the food systems. COVID-19 proved how human, livestock and environmental health are interrelated with regards to the food systems. Hence, regulation needs to grow out of only production and distribution and become more holistic to counter the very harsh climate related problems of the future. **For the coming few decades the SWOT analysis shows that Turkey's governments also must consider supporting/managing:**

- a more equitable distribution of value added that reaches all the way down to the producing farmer.

- a cheaper transformation to digitalization in the food sector that can increase productivity at the farm level and traceability at the consumer level.
- a broader vision to mitigate the expected negative impacts of the climate change that will be increasing droughts and extreme weather conditions.
- a clearer support scheme that will include food logistics starting from railways across Turkey down to supporting the digital transformation of the transformation companies so that food loss is minimized.
- a more democratic approach to converting “cooperative” system in Turkey.

In Turkey's agricultural sector, farmers' income has been decreasing especially in the past five years. Financing problems related with higher input prices, marketing problems, natural disasters in recent years are now escalated by the distortions created with the COVID-19 pandemic. During 2015-2020 there was an almost two-fold increase in non-performing loans in Turkey's the agriculture sector. The tricky part with the restructured part of the farmer's debt is that the number of non-performing borrowers appears lower than the actual. As the restructured loans exit the non-performing loans category, they are classified as performing loans, yet the reality is a good portion of these loans are not possible to be repaid.

Since mid-80's Turkey's food sector is not only focused on agricultural production but processing in the food industry to meet the demand from domestic and exports markets. In Turkey's special case, the structural problems in the food value chain fuel food price inflation, food price volatility as they also generate low income for farmers and at the same time high food prices for consumers. A major reason

for the high and sticky food price inflation in Turkey starts from the first step of the value chain- that is the high input costs.

A commonly voiced problem in Turkey is the length of the food value chain.

The government of Turkey recently drafted a much debated “Wholesale Food Market Law” to address the intermediary problem in Turkey's food value chain. The aim of the law is to make a structural change and shorten the value chain hence lower food price inflation through better registration of the participants and the food being transferred. At the same time, it aims to reduce food waste in Turkey.

As the world's climate continues to heat up and the impacts of that warming grow more frequent and severe, farmers and farm communities around the world will be increasingly challenged.

Turkey with its geographical location will be fully exposed to the impacts of climate change. Rising average temperatures, falling average precipitation and the increased frequency and intensity of extreme climate events such as heat waves and droughts will negative affect agriculture in Turkey. Climate change will also cause significant yield fluctuations due to its impacts on crops' phenological development. Price changes due to yield losses and profitability variations will cause product pattern changes. Business as usual will not protect the future of food supply, the well-being of the farmers and communities that produce it. To make agriculture sustainable in Turkey, concrete steps to prepare for climate impacts on agriculture are needed.

Turkey urgently needs sign the “Paris Agreement” and prioritize policies to drastically reduce net emissions of heat-trapping gases. Only seven

countries - Iran, Iraq, Libya, Turkey, Eritrea, South Sudan, and Yemen - are yet to sign. The future of sustainable agriculture passes through effective fight against climate change and investments accordingly. Turkey will fail to issue Green Bonds and attract the much-needed investments to mitigate the effects of climate change that is very real if the government fails to agree with Paris Climate Pact.

Each year Turkey produces roughly 52 million tons of fresh vegetables and fruits that are worth roughly USD 40 billion. Studies reveal that losses average 15% to 50% of the total production. The main reasons for the losses are decays due to diseases occurring in the post-harvest period, lack of pre-cooling, lack of preservation in a controlled atmosphere, lack of proper packaging, handling and transportation.

Turkey has been a prominent global player in terms of production scale and product variety with its food and agriculture sectors. Yet, **technological progress requires vision and funds, and Turkey is a laggard in employing digitization to achieve high value-added food stuff.** The financial ability and digital knowledge of farmers is another obstacle. The current financial circumstances in Turkey prevent most farmers from adopting AgTech at an optimal rate. Moreover, the lack of general knowledge about technology, its benefits and how it works also hinders digitization. To develop digital farming in Turkey, governments will have to set strategic priorities.

GAP (South Eastern Anatolian Project) is a multi-sectoral and integrated regional development project based on the concept of sustainable

development. As of now the Gap Action Plan for 2014-2018 is functional, which aims more growth in the area. After the GAP Master Plan, new approaches to economic and regional development were adopted with higher sensitivity to environmental issues along with the prominence of such concepts as human development, participation, equality, fairness, sustainability, and gender balance.

Turkey's blessed soils, lands, and plantation quality welcome food sector and agricultural farmland investors from all around the world. The ability to feed its 83.3 million population, roughly 40 million foreign tourists each year and yet preserving its net food exporter position now is crowned with the COVID-19 test when the food market experienced no food shortages. With regards to food sector, Turkey is a unique country blessed with an inherent power even to meet the challenges of a changing climate. Turkey's food sector proved it has excellent potential, but investment is needed to help farmers update production techniques, boost productivity and cope with climate change.

Given the natural advantages Turkey has related with the food sector, nonetheless, the on-going challenges require investments to bring the full potential out in the years ahead where food security and safety will be a priority for nations. Turkey has significant investment opportunities in agribusiness subsectors such as fruit and vegetable processing, animal feed, livestock, poultry, dairy, functional food, fisheries, food logistics, digitalization, AgTech and enablers (cold chain distribution, greenhouses, irrigation, and fertilizer). The Turkish government offers

a set of incentives for potential agribusiness investors as Turkey is looking to position itself as the preferred option for being the regional headquarters and supply center of top global players in the agricultural sector.

With COVID-19 lessons at hand, the domestic distribution of locally produced food stuff such as meat, dairy, ready to eat food also propose interesting investment/collaboration opportunities as such distribution via online markets offer much better margins to a select group of urban customers.

The challenges Turkey's food sector faces also presents major opportunities for both local and foreign investors.

PRELUDE

1 PART

“TURKEY IN FIGURES”



A1 //

THE VERY BASICS: GEOGRAPHY & POPULATION

Turkey is in the Northern Hemisphere and its surface area is 780 043 km² long. The Asian (Anatolian) part makes up of 97% of the total while the remaining 3% lies in Europe. Such a land places Turkey as the 37th largest among the countries in the world.

Having an almost rectangular shape, Turkey measures 1 600 km from west to east (from 25°40' to 44°49' E longitude), and 650 km from south to north (from 35°51' to 42°06' N latitude). Its land border is 2 875 km; shared with Greece (203 km) and Bulgaria (269 km) on the northwest; with Georgia (276 km) on the northeast; with Armenia (325 km), Azerbaijan (18 km), and Iran (529 km) on the east; and with Iraq (378 km) and Syria (877 km) on the south. The length of the total sea border is 8 333 km stretching along the Mediterranean Sea in the south, the Aegean Sea in the west, and the Black Sea in the north. Turkey has an inland Sea of Marmara in northwest, between the world's two important straits of the Dardanelles and the Bosphorus that connect the Black Sea to the rest of the world.

// Figure 1. The Map of the Republic of Turkey



Turkey population at 83.5 million has recorded a staggering increase of 13.9% yoy as of 2019 as it hosts almost 3.5 million of refugees mainly coming from Syria. The birthrate is still high with 1.9%; yet has dropped from 2.2% a decade ago.

As per the 2019 figures, young population between ages of 15-24 constitutes 15.6% of Turkey's population: the highest among the 28 European Union member countries. The same group with 25.4% also has one of the highest unemployment rates within the same category. The average household size is 3.35 and declining given the high level of urbanization with roughly 80% of the population living in cities as of 2019 with rapid urbanization in the last 20 years. The median age is 32 and 68% of the population is between the ages 15 to 64. Turkey's 2007 and 2019 population pyramids (that show the changes in the age-sex structure of the population) reveal that there is increase in the elderly population and rise in the median age. The change is due to the decline in the fertility and mortality rates.

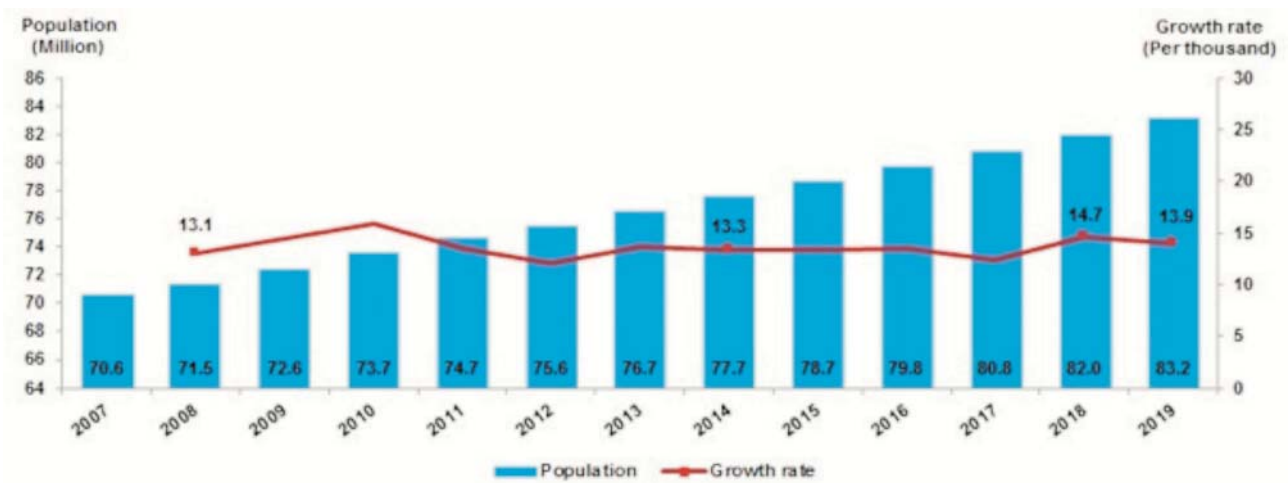
Still, about 56% of the population being below 35 years of age makes Turkey a

very dynamic country fueling consumption, creating demand for food and healthier lifestyles.

Before the 2020 curfew measures due to the COVID-19 pandemic, foreign tourist arrivals were 45 million in 2019. The pandemic obviously slashed the tourist arrivals by a sizable 70% in 2020; nevertheless, with the vaccination in the pipeline and gradual normalization from the curfew measures in the horizon to recover travelling, Turkey's tourist arrivals are expected to pick up in tandem; starting from 2H21.

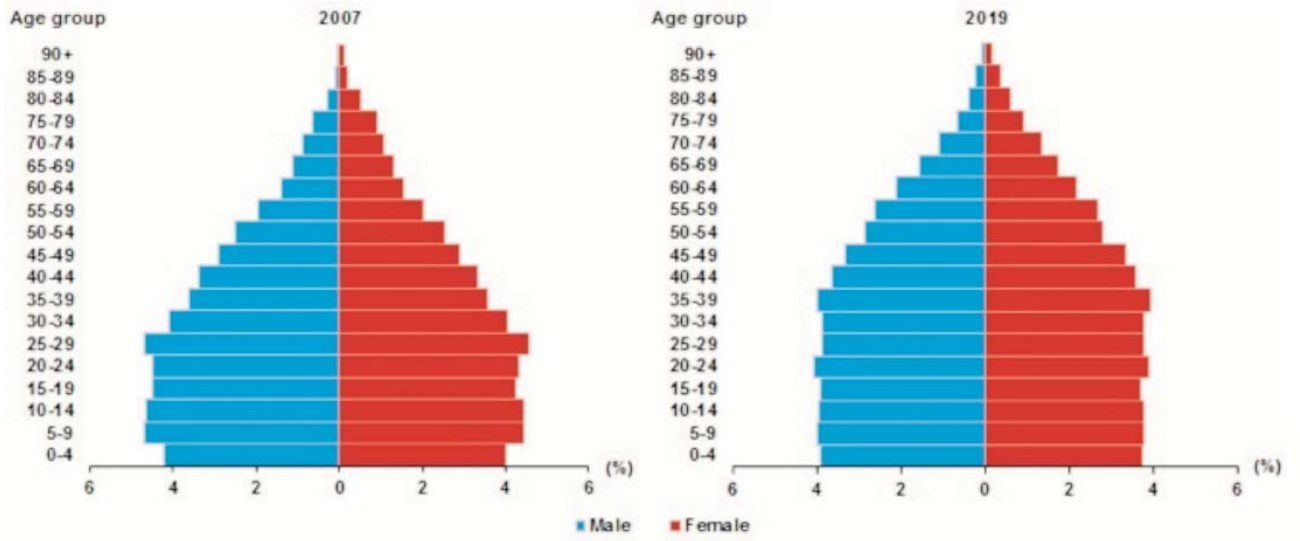
Hence, Turkey with its USD 750 billion GDP as of 2019, its food and beverage sector that accounts to 10% of its GDP, each year secures to feed roughly 130 million people with the young population seeking healthier, locally produced-processed, cheaper foods on their tables.

// Figure 2. Population and annual population growth rate, 2007-2019



Source: Turkstat, 2020

// Figure 3. Population pyramid, 2007, 2019



Source: Turkstat, 2020

A2 //

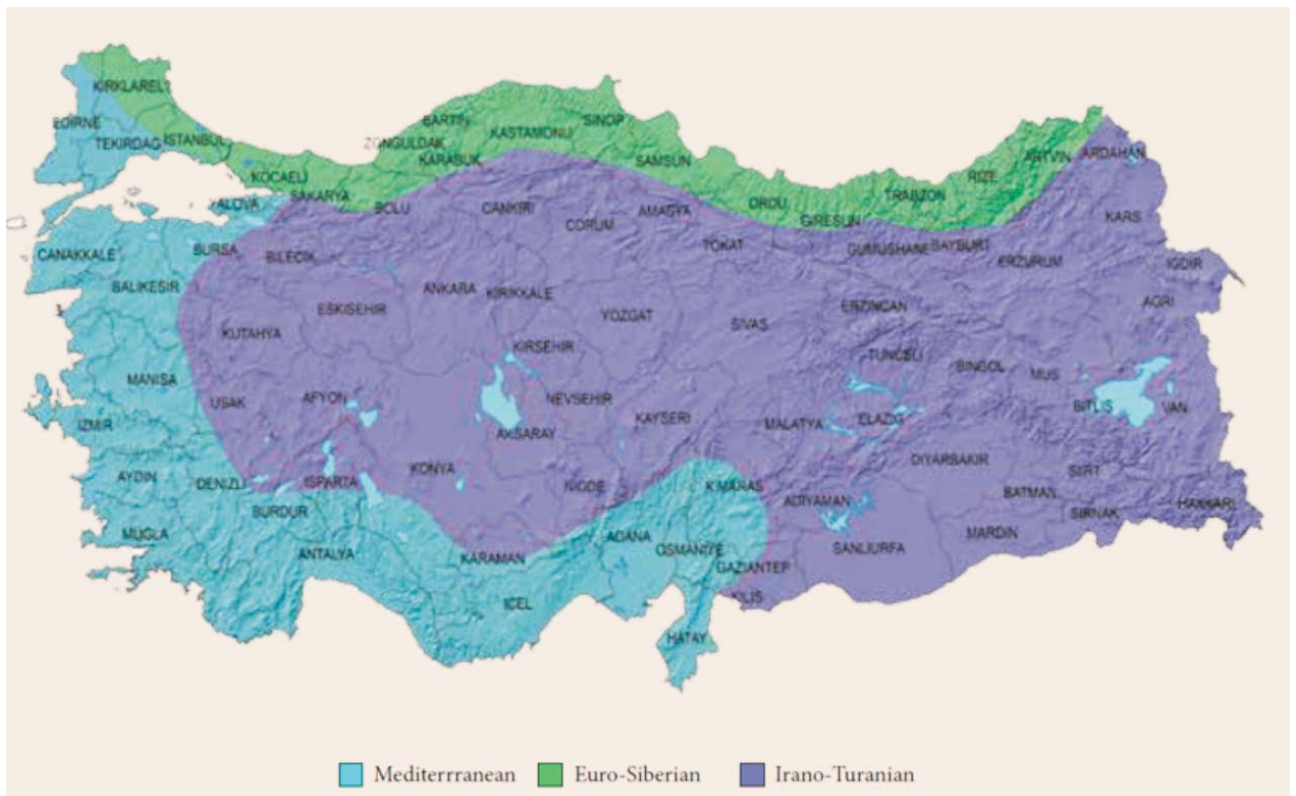
THE BLESSING OF VAST BIODIVERSITY

Each presenting a variety of ecosystems, Turkey lies at the heart of three main biogeographical regions: Mediterranean, Euro-Siberian and Irano-Turanian. Despite rapidly increasing environmental problems and rapidly declining biological diversity across the globe, Turkey's agricultural

lands and aquatic environments are still among the least polluted territories according to FAO (2019) in Europe thanks to the relatively limited use of artificial fertilizers and chemicals.

The Mediterranean Region has the world's largest cypress forests. The Euro-Siberian Region covers the entire northern parts from Bulgaria in the west, to Georgia in the east situated with mostly mildly deciduous forests and high alpine pastures. The Irano-Turanian Region extends all the way from the Eastern Aegean Region towards central, east, and south east Anatolia; dominated by a typical steppe savanna. The coasts and marine ecosystems are suitable for clean breeding for many aquatic species.

// Figure 4. Turkey Ecosystems Map



Source: Turkstat, 2020

The climate of Turkey is remarkably diverse with several distinct microclimates and weather patterns.

//

The Central Anatolia Region and the most-eastern part of the continental Eastern Anatolia Region have subtropical steppe climate.

//

Black Sea Region is dominated by the temperate-rainy or humid-temperate climate without a dry season.

//

The dry summer subtropical Mediterranean climate is found in Marmara, Aegean, Mediterranean and, Southeastern Anatolia Regions and the western and southern portions of the continental Central Anatolia Region.

//

The Mediterranean climates dominating coastal areas along the

Mediterranean and the Aegean Seas are characterized by cool, wet winters and hot, dry summers; hence are popular with tourists during the summer period from April to September.

//

The cold snowy forest climate with a dry summer is found over a relatively large zone including the mid-northern portions of the continental Central and Eastern Anatolia Regions of Turkey.

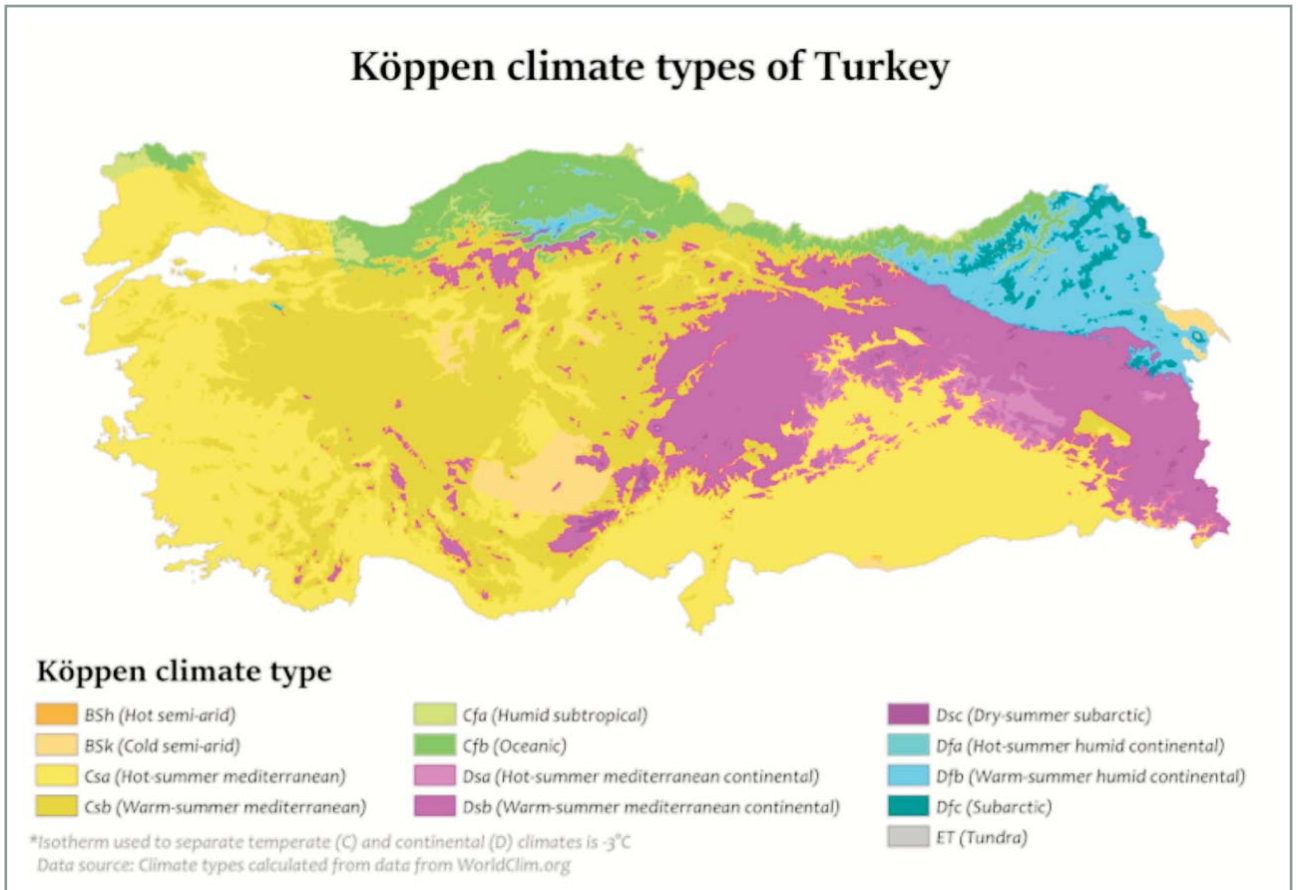
//

The cold snowy forest climate, humid in all seasons, is found over relatively small areas in the northern portions of the continental Central Anatolia Region and the northern Eastern Anatolia sub-region of Turkey.

Average annual temperatures vary widely throughout the country depending on the elevation, and topography. Throughout the year, highest temperatures are recorded in July and August. Average

temperature during these two months is 27 °C on Mediterranean and Aegean coasts and 22 to 24 °C on the Marmara and Black Sea coasts and fluctuates between 4 to 18 °C in the interior.

// Figure 5. Turkey Climate Zones and Soil Map



Source: WorldClim.org

// Figure 6. Turkey Soil Map



Source: www.turkey.gov.tr



A3 // DROUGHT AS A FACT OF CLIMATE CHANGE FOR TURKEY

Drought is primarily caused when a geographic region receives little rain for an abnormally long time. A meteorological drought occurs when a drought is combined with increased temperatures and lower humidity. A drought can turn into an agricultural drought when irrigation water and soil moisture are insufficient for agriculture. A hydrological drought develops when there is a reduction in river flow and underground water.

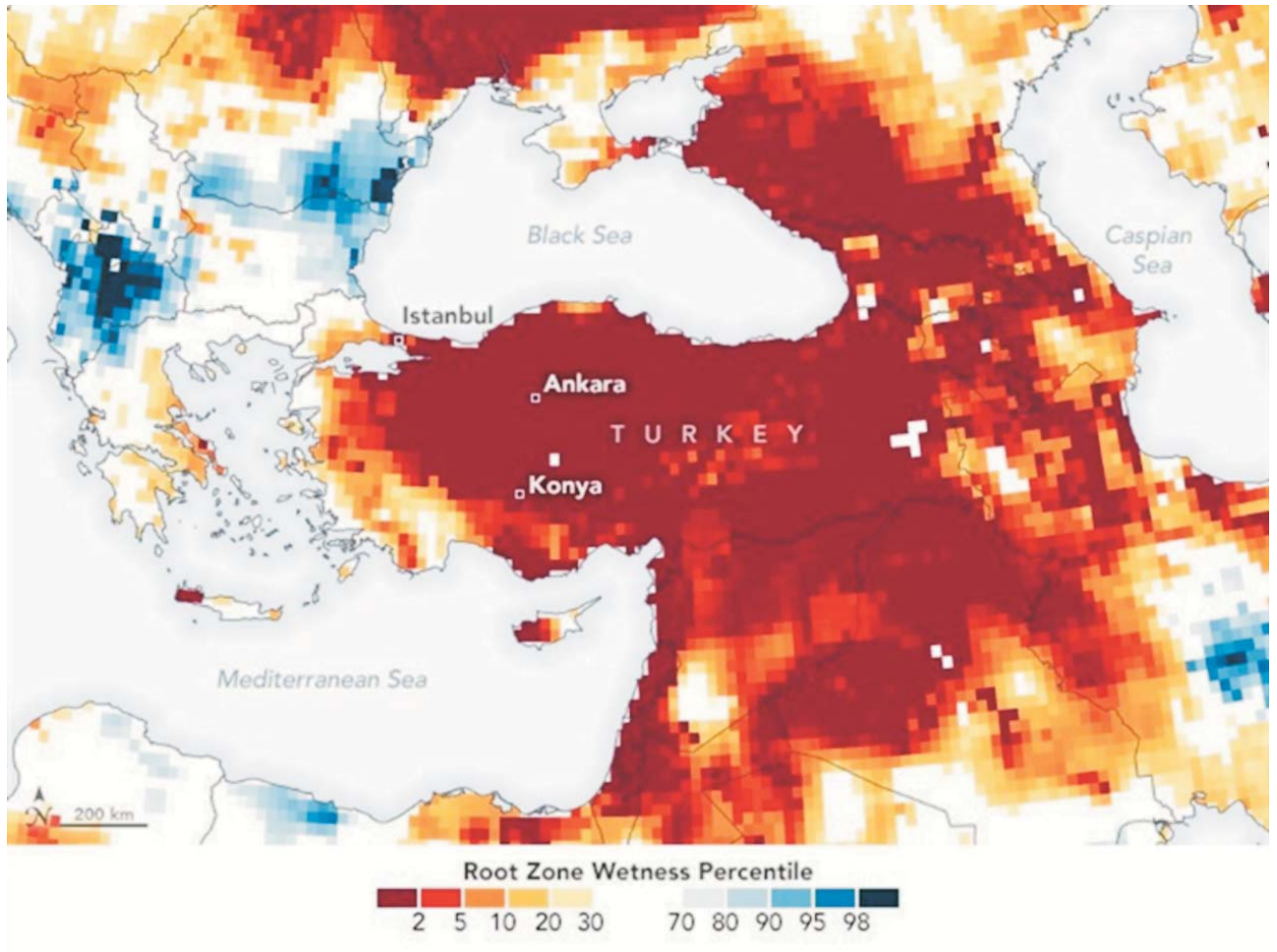
Turkey is currently experiencing a severe meteorological drought as of 2020;

progressing from a meteorological drought to an agricultural and hydrological drought due to a significant reduction in the winter precipitation.

NASA in two maps prepared by combining satellite images and Turkey's groundwater and soil moisture data showed recently that more than 80% of Turkey's soil facing "severe drought."

Turkey may face big threats to its agriculture if water levels do not rise in the near future. The country spent months in 2019 without precipitation and in the second half of 2020, the country survived drought. Since July 2020, the rate of rainfall or snow in all provinces of the country is under the norms. Precipitation in the country between October and December 2020 was some 48% less than the average of the numbers between 1981 and 2010. There are three colors on the maps presenting groundwater and soil moisture levels. The blue areas are regions with more water than normal levels. The orange and the red zones present regions with less than normal levels.

// Figure 7. Turkey Drought Map



Source: NASA

Since Turkey is located in the Mediterranean macroclimate region in the sub-tropical zone, great rainfall variations can be seen between the years. This causes regional and widespread droughts in various intensities.

Yet, the increased frequency and severity of meteorological droughts in Turkey notably since 2013 are caused by changes in global climate patterns. Hence, drought in Turkey as the byproduct of global climate changes will become a normal part of daily life in the years ahead. As a result, Turkey needs to make plans for its drinking water requirements, meet its demand for hydroelectric energy from

sustainable alternatives, and implement agricultural irrigation methods that can withstand droughts.

Agriculture is the most important user of water of all sectors (72%). The main problem in agricultural water use is related to the efficiency of irrigation methods. On only 10% of the total irrigation area the water efficient sprinkling and drip irrigation technologies are used; in the majority of fields (90%) there is inefficient and highly water consuming surface irrigation. Since the drought impacts in 2007 the Turkish government has taken several decisions to tackle the impact of droughts. Modern irrigation systems are being promoted, provincial drought

commissions have been established in the regions, and drought action plans have been prepared. Basins have been closed to the groundwater exploitations. Other measures that should be taken are: the renewal and modernization of irrigation systems; installing water flow meters;

closing unregistered wells; the construction of surface water storing structures; pricing of groundwater used in agriculture; raising public awareness for saving water.

A4 //

TURKISH ECONOMY-BASICS 2015-2020

Turkey with its USD 750 billion economy ranks as the 19th largest economy in the world according to the International Monetary Fund (IMF) as of 2019. The country is an associate member of the European Union (EU) and is in a Customs Union with the EU.

The average real Gross Domestic Product (GDP) growth between 2015 and 2019 was about 4%. Turkish economy faced a major currency crisis in August 2018 and in mid-2020; both slowing its GDP growth performance. Despite initial IMF expectations of around 5% contraction in 2020 due to COVID-19 related economic troubles, Turkey is to post 1.8% GDP growth in a very tough year like 2020 and 4% growth is expected in the Turkish economy in 2021. Such an ambitious growth performance that placed Turkey among the very few that was able to post

a real GDP increase in 2020, created further macroeconomic imbalances on top of Turkey's existing structural economic challenges. Looking forward, annual average projected GDP growth is 3.5% for 2020 and 2024.

Turkey suffers from high inflation with CPI inflation at 14.6% on annual basis as of 2020 end and food price inflation at 20%. Tight monetary policy is being practiced as of the end of 2020 which will be a drag on Turkey's growth performance in the year ahead. Yet, the government that has elections scheduled at 2023 has promised economic and legal reforms due for 2021 to reach Turkey's average growth potential of 5%.

Nonetheless, its population of 83.4 million with a median age of 32, coupled with an increasing household income trend over the past two decades drives the retail industry and the food sector demand. The Food Retail Sales Index has shown an upward trend in general in real terms over the last five years.



| TURKEY AT A GLANCE | | | | | | |
|--|------------|------------|------------|------------|------------|------------|
| | 2000 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Population, total | 63.240.194 | 78.529.409 | 79.821.724 | 81.101.892 | 82.319.724 | 83.429.615 |
| Population growth (annual %) | 1,5 | 1,7 | 1,6 | 1,6 | 1,5 | 1,3 |
| Surface area (sq. km) | 785.350 | 785.350 | 785.350 | 785.350 | 785.350 | 785.350 |
| Population density (people per sq. km of land area) | 82,2 | 102,0 | 103,7 | 105,4 | 107,0 | .. |
| Poverty headcount ratio at national poverty lines (% of population) | .. | 14,3 | 13,5 | 13,9 | 14,4 | .. |
| Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population) | .. | 0,2 | 0,2 | 0,1 | 0 | .. |
| GNI per capita, Atlas method (current US\$) | 4.320 | 12.030 | 11.260 | 10.980 | 10.520 | 9.690 |
| GNI per capita, PPP (current international \$) | 9.490 | 25.470 | 26.230 | 27.780 | 27.960 | 27.660 |
| Income share held by lowest 20% | .. | 5,6 | 5,7 | 5,8 | 5,8 | .. |
| Life expectancy at birth, total (years) | 70,0 | 76,5 | 76,9 | 77,2 | 77,4 | .. |
| Urban population growth (annual %) | 2,3 | 2,4 | 2,3 | 2,3 | 2,2 | 2,0 |
| Energy use (kg of oil equivalent per capita) | 1.201,1 | 1.651,4 | .. | .. | .. | .. |
| CO2 emissions (metric tons per capita) | 3,4 | 4,5 | 4,7 | .. | .. | .. |
| Electric power consumption (kWh per capita) | 1.652,7 | .. | .. | .. | .. | .. |
| GDP (current US\$ mn) | 274.302 | 864.314 | 869.683 | 858.988 | 778.381 | 761.425 |
| GDP growth (annual %) | 6,9 | 6,1 | 3,3 | 7,5 | 3,0 | 0,9 |
| Inflation, GDP deflator (annual %) | 49,4 | 7,8 | 8,1 | 11,0 | 16,5 | 13,9 |
| Agriculture, forestry, and fishing, value added (% of GDP) | 10,0 | 6,9 | 6,1 | 6,0 | 5,8 | 6,4 |
| Industry (including construction), value added (% of GDP) | 26,8 | 27,8 | 28,1 | 29,1 | 29,4 | 27,2 |
| Exports of goods and services (% of GDP) | 19,9 | 24,5 | 23,1 | 26,0 | 31,2 | 32,7 |
| Imports of goods and services (% of GDP) | 22,5 | 26,6 | 25,2 | 29,7 | 31,3 | 29,9 |
| Gross capital formation (% of GDP) | 23,7 | 28,2 | 28,0 | 30,7 | 29,3 | 24,8 |
| Time required to start a business (days) | .. | 11 | 10 | 10 | 7 | 7 |
| Domestic credit provided by financial sector (% of GDP) | .. | 77,1 | 80,1 | 80,1 | 82,1 | 82,6 |
| Tax revenue (% of GDP) | .. | 18,2 | 18,3 | 17,8 | 17,8 | 16,7 |
| Military expenditure (% of GDP) | 3,7 | 1,8 | 2,1 | 2,1 | 2,5 | 2,7 |
| Mobile cellular subscriptions (per 100 people) | 25,5 | 93,8 | 94,0 | 95,9 | 97,3 | 96,8 |
| High-technology exports (% of manufactured exports) | .. | 2,6 | 2,5 | 2,9 | 2,3 | 3,0 |

Source: World Bank

During 2015-2018, although Turkey's economy enjoyed significant positive growth, the challenges resurfaced in 2018-2019-2020. Amidst its currency shock that was the by-product of strong GDP growth of 7.4% in 2017 hence a widening current account deficit, its GDP has contracted in the last quarter of 2018 and first two quarters of 2019 in terms of seasonally adjusted real GDP figures. Such a recession negatively impacted employment, investment, and growth. The value of the Turkish Lira (TL) also depreciated rapidly since summer 2018, turning volatile throughout 2019 and significantly weakening in the 4Q20; losing more than 50% of its value during the mentioned three years.

The TL depreciation and structural rigidities in Turkey's agricultural sector skyrocketed food price inflation to 25.1% as of December 2018. Along with the severe rate hikes and TL appreciation Turkey's CPI inflation and food price

inflation eased gradually into mid-2019 when the economic recovery started again to around 11%. On annual basis Turkey's GDP eased down to 2.8% as of 2018 and then to 0.9% in 2019.

In 2020, following 4.5% GDP growth in the first quarter the COVID-19 shock resulted with 10% GDP contraction in 2Q20. As the credit boom based growth turned Turkey's GDP growth positive to a tune of 1.8% in 2020, food and beverage inflation once again reached to 20%, with the TL weakness, COVID-19 pandemic playing major roles in the price inflation spike.

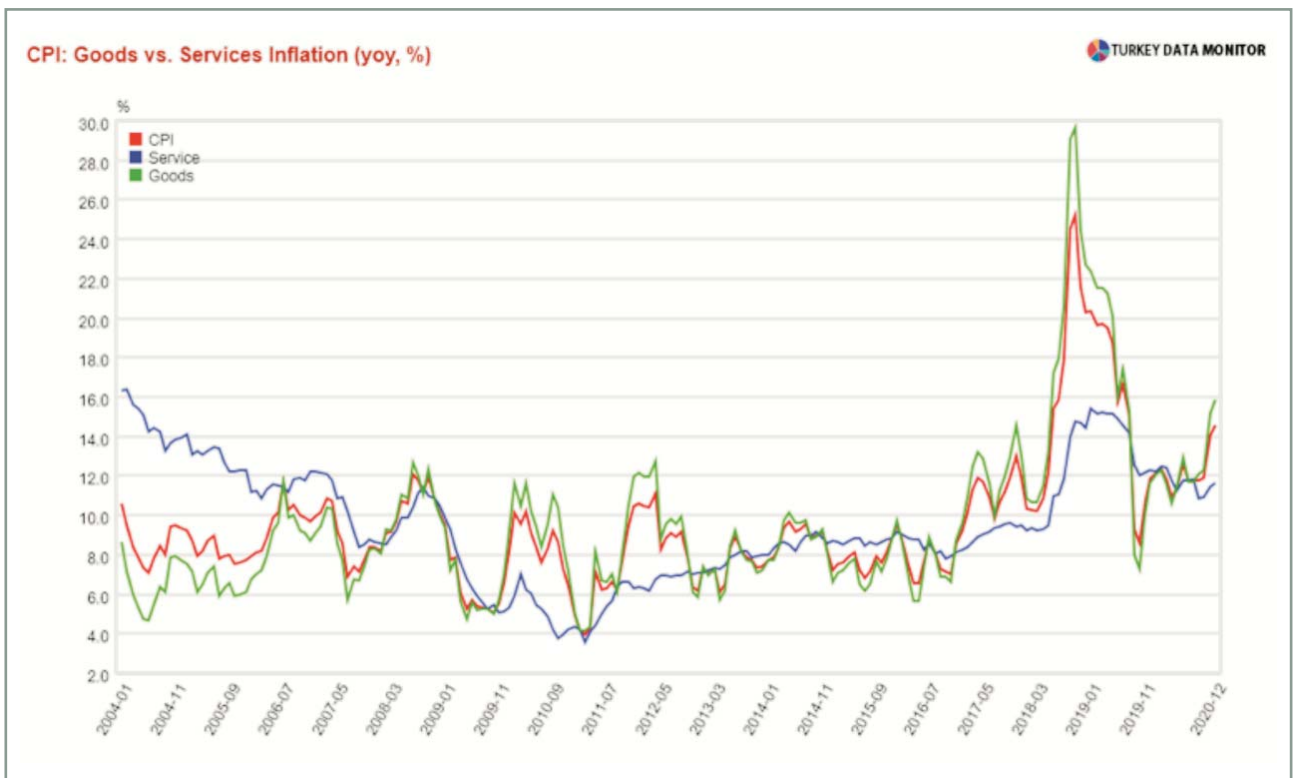


// Figure 8. Turkey Real GDP Growth (2005-2020)



Source: Turkstat, TDM

// Figure 9. Turkey Goods and Services Price Inflation (2005-2020)



Source: Turkstat, TDM

A5 //

FOOD AND BEVERAGE SECTOR FOREIGN TRADE

On a global scale, Turkey's food and beverage sector has 1.4% share in the global food and beverage industry and ranks as the 22nd. Yet, it ranks the 10th in terms of agricultural production value with USD 68 billion that accounts to roughly 10% of its GDP. Around 1600

varieties in Turkey's agricultural products are designated to 180 countries around the globe.

Since 2005, Turkey is positioned as a net exporter in its food and beverages sector and such status was maintained despite the COVID-19 outbreak in 2020 that severely affected food logistics across the globe.

As per the TGDF Digital Data Panel prepared by Agrimetr based on General Trade System (GTS) data, Turkey was able to post USD 4.3 bn food and beverage trade surplus in 2020 with USD 18.6 bn of exports and USD 14.3 bn of imports as per the Jan-Nov figures.

Turkey's unit exports are valued at USD 1,018 while its unit value of imports is much lower at USD 471.

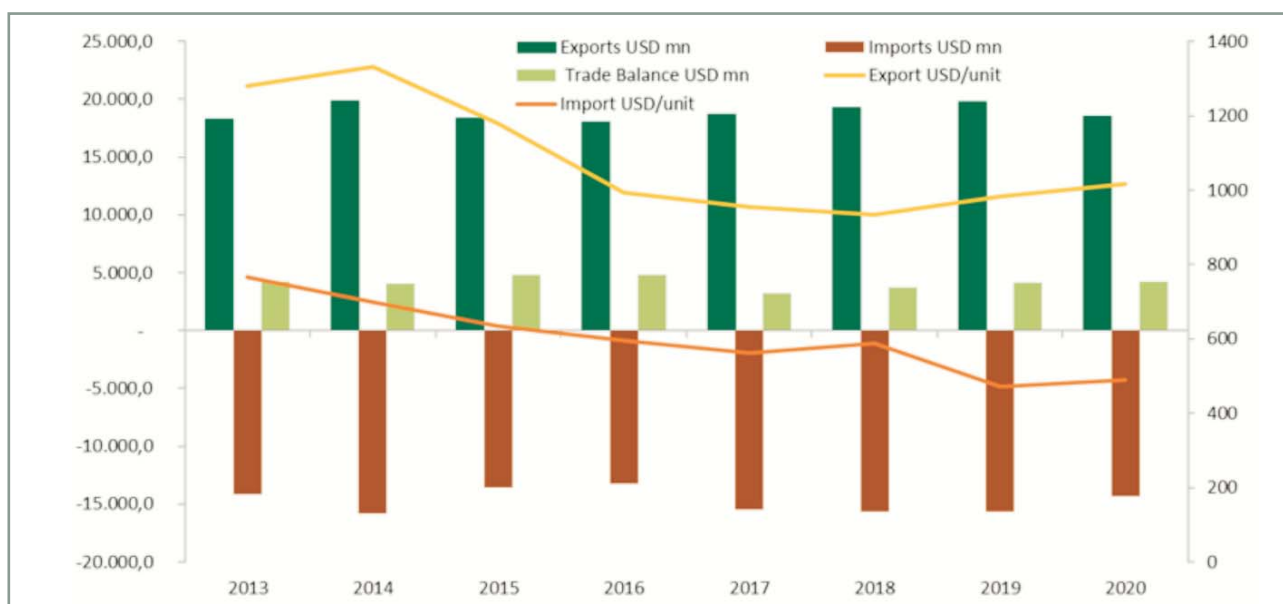
// Figure 10. Turkey Food and Beverage Foreign Trade

| | Exports USD mn | Imports USD mn | Trade Balance USD mn | Export USD/unit | Import USD/unit |
|------|-------------------|-------------------|----------------------|-----------------|-----------------|
| 2013 | 18.326,4 | -14.131,0 | 4.195,4 | 1281 | 767 |
| 2014 | 19.873,5 | -15.809,3 | 4.064,2 | 1332 | 700 |
| 2015 | 18.414,9 | -13.580,5 | 4.834,4 | 1180 | 635 |
| 2016 | 18.019,1 | -13.256,2 | 4.762,9 | 994 | 596 |
| 2017 | 18.666,3 | -15.467,7 | 3.198,6 | 954 | 561 |
| 2018 | 19.313,1 | -15.612,0 | 3.701,1 | 933 | 589 |
| 2019 | 19.756,6 | -15.615,5 | 4.141,1 | 983 | 471 |
| 2020 | 18.554,3 | - 14.298,9 | 4.255,4 | 1018 | 491 |

Source: tgdf.org.tr



// Figure 11. Turkey Food and Beverage Foreign Trade, (2013-2020)



Source: tgdf.org.tr

In the same period of 2020, the prominent export products were hazelnut, flour and pasta, respectively while these products accounted for approximately 13.9% of total exports. The most imported products were wheat, soybean and sunflower oil, respectively making up approximately 23.8% of the total.

When Turkey's food and beverage sector foreign trade data of 2020 are examined by sectors, five sectors make up 43.4% of the total: hard shell fruits, fresh fruits, sugar and sugary products, vegetable oil and dried fruit / vegetable sectors. As for

imports by sectors, 65.1% consist of these five: animal feed, vegetable oil, flour, starch and cocoa-chocolate sectors. The animal feed sector alone, with a volume of USD 3.4 bn constituted 23.7% of total imports.

The figures reflect that while Turkey's food and beverage exports are concentrated in a small number of sectors, in a country of rich stockbreeding and vast land suitable for feed growth, the level of animal feed imports is alarmingly high. It also explains one of the main reasons for the recent spike of food price inflation in Turkey.

// Figure 12. Food and Beverage Foreign Trade Balance by Items, (2020)

| Major Deficit Sectors | USD mn | Major Surplus Sectors | USD mn |
|-----------------------|---------|------------------------|---------|
| Animal Feed | 2,856.6 | Fresh Fruits | 1,643.3 |
| Flour | 1,084.1 | Hard Shelled Fruits | 1,596.7 |
| Vegetable Oil | 944.5 | Sugar and its Products | 1,272.0 |
| Livestock | 290.5 | Dried Fruits | 992.5 |
| Starch | 173.1 | Aquaculture Products | 741.3 |
| Milled Rice | 147.7 | Vegetables | 570.1 |
| Alcoholic Beverages | 60.1 | Pasta | 463.3 |
| Red Meat | 19.0 | Processed Poultry | 347.3 |

Source: tgdf.org.tr

When Turkey's food and beverage foreign trade data is examined by countries, the available 2020 data show the top three countries as Iraq with USD 2.6 bn, Germany with USD 1.5 bn and Russia with USD 1.2 bn. Exports to these three

countries made up 28.6% of the total exports. Examining country data for imports, Russia with USD 2.8 bn, Brazil with USD 1.3 bn and Ukraine with USD 0.9 bn stand out making up 35% of total food and beverage imports in Turkey.

// Figure 13. Food and Beverage Foreign Trade by Countries, (2020)

| Major 10 Exports | USD bn | Major 10 Imports | USD bn |
|------------------|--------|------------------|--------|
| Iraq | 2.621 | Russia | 2.772 |
| Germany | 1.507 | Brazil | 1.317 |
| Russia | 1.167 | Ukraine | 866 |
| USA | 969 | USA | 826 |
| Italy | 772 | Malaysia | 542 |
| UK | 600 | China | 452 |
| Netherlands | 585 | Argentina | 429 |
| Syria | 576 | Germany | 419 |
| Saudi Arabia | 464 | Netherlands | 417 |
| France | 368 | Canada | 404 |

Source: tgdf.org.tr

// Figure 14. Food and Beverage Foreign Trade by Items, (2020)

| Top 15 Exports | USD bn | Top 15 Imports | USD bn |
|----------------------|--------|----------------------|--------|
| Hard Shelled Fruits | 2.065 | Animal Feed | 3.390 |
| Fresh Fruits | 1.911 | Vegetable Oil | 2.341 |
| Sugar & its Products | 1.658 | Flour | 1.963 |
| Vegetable Oil | 1.397 | Starch | 962 |
| Dried Veg. & Fruits | 1.013 | Cacao & Chocolate | 650 |
| Flour | 897 | Tobacco & Prod. | 606 |
| Aquaculture Prod. | 875 | Leguminous Seeds | 497 |
| Tobacco & Prod. | 810 | Hard Shelled Fruits | 469 |
| Starch | 789 | Sugar & its Products | 386 |
| Vegetables | 741 | Livestock | 363 |
| Pasta | 630 | Pasta | 304 |
| Cacao & Chocolate | 578 | Fresh Fruits | 267 |
| Leguminous Seeds | 545 | Milled Rice | 258 |
| Animal Feed | 534 | Seed & Seedlings | 192 |
| Poultry | 372 | Alcoholic Beverages | 138 |

Source: tgdf.org.tr

// Figure 15. Food and Beverage Foreign Trade by Items, (2020)

| Major 10 Exports | Top Three Items | Major 10 Imports | Top Three Items |
|------------------|--|------------------|--|
| Iraq | flour, sugar, vegetable oil | Russia | flour, vegetable oil, animal feed |
| Germany | hard shelled fruits, fresh fruits, dried fruits | Brazil | animal feed, livestock, tobacco&prod. |
| Russia | fresh fruits, vegetables, aquaculture prod. | Ukraine | animal feed, flour, vegetable oil |
| USA | sugar&prod., fruit juice, flour | USA | starch, hard shelled fruits, animal feed |
| Italy | hard shelled fruits, aquaculture prod., dried fruits | Malaysia | vegetable oil, flour, cacao&chocolate |
| UK | hard shelled fruits, fresh fruits, sugar&prod. | China | milled rice, flour, fruit juice |
| Netherlands | aquaculture prod., dried fruits, hard shelled fruits | Argentina | vegetable oil, animal feed, leguminous seeds |
| Syria | vegetable oil, animal feed, flour | Germany | starch, tobacco&prod., sugar&prod. |
| Saudi Arabia | sugar&prod., milk &prod., tobacco &prod. | Netherlands | starch, tobacco&prod., cacao&chocolate |
| France | hard shelled fruits, dried and fresh fruits&veg. | Canada | animal feed, pasta, leguminous seeds |

Source: tgdf.org.tr

A6 // THE BASE OF THE FOOD SECTOR: AGRICULTURE PRODUCTION 2015-2020

Turkey, one of the leading countries in the world in agriculture and related industries, is a country that has been lucky enough

to feed its own population at 83.4 million, the incoming 45 million foreign visitors each year and yet remain as a net exporter for several signature items among its produce, thanks to its wide range of agricultural products.

Number one in Europe and the 10th on a global scale of world's largest producers, agriculture is of key importance in Turkey both in social and economic terms. Fertile soil, adequate climate and rainfall make Turkey one of the few self-sufficient countries in the world when it comes to food production as almost any type of crop is easily grown. Farming and animal husbandry are conducted in all regions.

Strengths are related to a large domestic market, a young population, a dynamic

food industry, vast biodiversity and a surplus in net food foreign trade. In Turkey, Good Agricultural Practices (GAP), which is based on integrated crop and pest management, is regulated and subsidized in primary production of plant, animal and aquaculture food products.

Yet, the food and the agriculture sector in Turkey faces many challenges as well.

Current and future problems are sustaining growth along the lines of food security, food safety and climate change dynamics. Satisfying the increasing demands of a growing population while enhancing economic prosperity and social wellbeing, protecting natural resources such as soil, water and biodiversity require a solid strategy and hands on policy adaptation. Even a self-sufficient country like Turkey needs to give priority to “sustainability” and improve the trade-off between agricultural production versus ecosystems conservation, biodiversity improvement, and preservation of water and soil quality in agriculture-related ecosystems which in general is called “the environment”.

A snapshot of the sector would show that along with the industrialization efforts of the last couple of decades, the share of agriculture sector in Turkey's GDP has been on a declining trend. From around 20% back in the 1980's, as of 2019, the agriculture sector's share in GDP stands at 9.0% compared to 7.0% in 2015. Out of Turkey's labor force at 31.5 million, the sector employs about 4.8 million people that constitute 17.5% of the total employment declining from roughly 23% in 2015.

In parallel to the global trends, Turkey's agricultural lands are a victim to the ever-enlarging city boundaries. While back in 2001 Turkey's land used for agricultural purposes was 40,967 thousand hectares, it has come down to 37,716 thousand as of 2019. The loss of agricultural land only in the last five years is 850 thousand hectares.

Nevertheless, about 36% of Turkey consists of arable land, and approximately 16.5% of it is irrigated.

// Figure 16. Turkey Agricultural Land, 2001-2019 (thousand hectares)

| | Total utilized agricultural land | Sown area | | Area of vegetable gardens | Area of ornamental plants | Area of fruits, beverage and spice crops | Pasture and meadows |
|------|----------------------------------|-----------|-------------|---------------------------|---------------------------|--|---------------------|
| | | | Fallow land | | | | |
| 2009 | 38 912 | 16 217 | 4 323 | 811 | - | 2 943 | 14 617 |
| 2010 | 39 011 | 16 333 | 4 249 | 802 | - | 3 011 | 14 617 |
| 2011 | 38 231 | 15 692 | 4 017 | 810 | 4 | 3 091 | 14 617 |
| 2012 | 38 399 | 15 463 | 4 286 | 827 | 5 | 3 201 | 14 617 |
| 2013 | 38 423 | 15 613 | 4 148 | 808 | 5 | 3 232 | 14 617 |
| 2014 | 38 558 | 15 782 | 4 108 | 804 | 5 | 3 243 | 14 617 |
| 2015 | 38 551 | 15 723 | 4 114 | 808 | 5 | 3 284 | 14 617 |
| 2016 | 38 328 | 15 575 | 3 998 | 804 | 5 | 3 329 | 14 617 |
| 2017 | 37 964 | 15 498 | 3 697 | 798 | 5 | 3 348 | 14 617 |
| 2018 | 37 797 | 15 421 | 3 513 | 784 | 5 | 3 457 | 14 617 |
| 2019 | 37 716 | 15 398 | 3 387 | 790 | 5 | 3 519 | 14 617 |

Source: tgdf.org.tr

As of 2019, out of the agricultural land of 37,716 thousand hectares, annual crops make up around 41% with 15,398 thousand hectares. Fallows account for 0.9% while the pasture and meadows make of 38.7% of the total.

While the agricultural land has been on a declining trend, the area reserved for fruits and spice crops increased over the same time. Its share in total reached 0.9% as of 2019 versus 0.7% a decade ago amidst the vast export opportunities in Turkey's fruit and spices sector combined with strong domestic demand.

A6.1 // Cereals & other Crop Products and Oil Seeds

Turkey's most-planted and the main staple cereal crop is wheat and in fact the country has provided about 2.1% of the world's overall production in 2019. It accounts for 64% of the area planted cereal crops, and has the largest share among other grains.

The pace of wheat imports and more valuable alternative crops, orchard development, greenhouse development, and vegetables with new irrigation areas are increasing their share of farm area every year in Turkey, which reduces wheat acreage.

About 20 tonnes of wheat were produced on 6.84 million hectares in 2019. While the land where wheat is cultivated is down by a sizable 36% since 2001, the amount of production being still the same underline the productivity gains over the course of the period; mostly due to better mechanization.

Yet, the stagnant trend of wheat production over the past five years is notable.

Wheat is the main ingredient of bread and bread has an important place in Turkish

people's food consumption. Turkey is one of the olden centers of origin for wild wheat of the olden centers of origin for wild wheat and species related to wheat as archaeological studies show that the southeastern Turkey known as the "Fertile Crescent" is the motherland of wheat.

Consumers keep seeking healthier food stuff in Turkey. Wheat produced with local varieties have different tastes and the rising trend in bread consumption patterns favor the regeneration of ancient seeds that were planted in Anatolia. These species have great importance for the adaptation, spread, and evolution of wheat, particularly for the genetic improvement of bread wheat although modern varieties of wheat were introduced to Turkey in the 1960's with the semi-dwarf wheat seeds from Mexico.

The majority of wheat is utilized for human consumption as flour and pasta (some of which is exported), with the rest of the wheat is used as feed. Seed and industrial consumption remain the same, so the increase in consumption is in the food and feed use sector, which usually varies inversely to the amount of wheat produced and quality expectations.

In addition to high domestic consumption, increasing exports are the driving force of the wheat products industry. Turkey's

wide range wheat products are roughly 20-21 million tonnes per year and exports wheat flour to 160 countries all over the world. The industry is negatively affected by a new policy limiting exports of domestically produced wheat and hence industry participants are asking for regulation change from the government. The export limiting state policy followed the August 2018 currency crisis in Turkey, as Turkish government instituted a new policy that prevented exports of flour

made from domestically grown wheat to try to halt a rise in domestic flour prices amid concerns that flour exports would swiftly increase following the currency depreciation. With a fine tuning made to the “inward processing regime”, Turkish millers are able to export flour only made from imported wheat. The initial uproar to the regulation change that resulted with losses for many millers in the industry was later partly offset in the early months of 2019.

// Figure 17. Production of cereals and other crop products for selected products, (2001-2019)

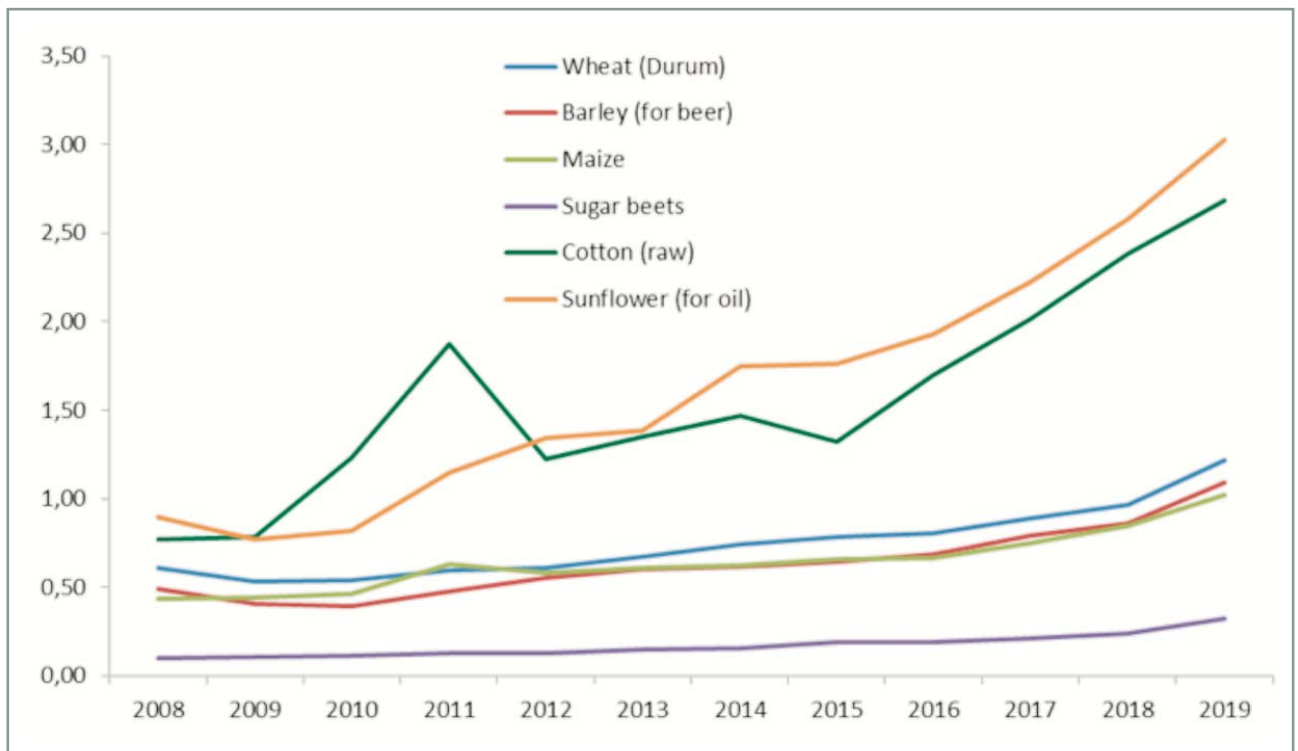
| | Wheat | Barley | Maize | Sunflower | Cotton (raw) | Sugar beets |
|----------------------------|------------|-----------|-----------|-----------|--------------|-------------|
| Production (Tonnes) | | | | | | |
| 2001 | 19 000 000 | 7 500 000 | 2 200 000 | 650 000 | 2 357 892 | 12 632 522 |
| 2002 | 19 500 000 | 8 300 000 | 2 100 000 | 850 000 | 2 541 832 | 16 523 166 |
| 2003 | 19 000 000 | 8 100 000 | 2 800 000 | 800 000 | 2 345 734 | 12 622 934 |
| 2004 | 21 000 000 | 9 000 000 | 3 000 000 | 900 000 | 2 455 071 | 13 517 241 |
| 2005 | 21 500 000 | 9 500 000 | 4 200 000 | 975 000 | 2 240 000 | 15 181 247 |
| 2006 | 20 010 000 | 9 551 000 | 3 811 000 | 1 118 000 | 2 550 000 | 14 452 162 |
| 2007 | 17 234 000 | 7 306 800 | 3 535 000 | 854 407 | 2 275 000 | 12 414 715 |
| 2008 | 17 782 000 | 5 923 000 | 4 274 000 | 992 000 | 1 820 000 | 15 488 332 |
| 2009 | 20 600 000 | 7 300 000 | 4 250 000 | 1 057 125 | 1 725 000 | 17 274 674 |
| 2010 | 19 674 000 | 7 250 000 | 4 310 000 | 1 320 000 | 2 150 000 | 17 942 112 |
| 2011 | 21 800 000 | 7 600 000 | 4 200 000 | 1 335 000 | 2 580 000 | 16 126 489 |
| 2012 | 20 100 000 | 7 100 000 | 4 600 000 | 1 370 000 | 2 320 000 | 14 919 940 |
| 2013 | 22 050 000 | 7 900 000 | 5 900 000 | 1 523 000 | 2 250 000 | 16 488 590 |
| 2014 | 19 000 000 | 6 300 000 | 5 950 000 | 1 637 900 | 2 350 000 | 16 743 045 |
| 2015 | 22 600 000 | 8 000 000 | 6 400 000 | 1 680 700 | 2 050 000 | 16 022 783 |
| 2016 | 20 600 000 | 6 700 000 | 6 400 000 | 1 670 716 | 2 100 000 | 19 592 731 |
| 2017 | 21 500 000 | 7 100 000 | 5 900 000 | 1 964 385 | 2 450 000 | 21 149 020 |
| 2018 | 20 000 000 | 7 000 000 | 5 700 000 | 1 949 229 | 2 570 000 | 17 436 100 |
| 2019 | 19 000 000 | 7 600 000 | 6 000 000 | 2 100 000 | 2 200 000 | 18 054 320 |

Source: Ministry of Agriculture and Forestry

Mainly grown for animal feed, barley is the second most cereal produce of Turkey. The 2019 production is 7.6 million tonnes reflecting a stable level over the past five years, cultivated in an area of 2.86 million hectares. Around 400 000 tonnes of the production is used in the malting industry. There are two major sectors using barley in Turkey. One is the malting and beer industry and the other is the feed sector. Malting barley consumption at around 0.9-1.0 million tonnes has been stable

over the years. Traditionally barley is consumed as a feed grain especially for ruminants in Turkey. However, barley consumption for feed use is directly linked with price. In years when there spike in the barley prices occur, feed companies alternatively prefer residual and waste products from various food industries, such as bran. The bigger picture however is that the growth in the feed sector stimulates the continuation of demand for barley.

// Figure 18. Prices of cereal and other crop product, TL/Kg, (2008-2019)



Source: Turkstat

In Turkey, **corn** is the grain that is grown most following wheat and barley production among other grains. Corn production is realized in 60 provinces of Turkey mainly in Mediterranean, the Black Sea, the Marmara, Aegean and in the Southeastern Anatolia Regions. 68% of the corn cultivation consists of grain corn fields and 32% of silage corn fields.

Corn that has an important role both in human nutrition and animal nutrition is produced in almost every region of Turkey. In 2019, maize production for Turkey was 6.0 million tonnes which seems to be on a declining trend since 2015. Still, according to the agricultural data of Turkish Statistical Institute (Turkstat); Turkey's corn production displayed an almost 150% increase in the last 20 years. Turkey, which produced 2.2 million tons of corn in 2001, reached 6.4 million tonnes production amount in 2016 thanks to

productivity gains. Drought on the other hand is a major threat against further spikes in Turkey's corn production.

Maize is either used for animal feed which is the largest portion of the production or for commercial starch production. Hence, hybrid and ordinary maize yields differ profoundly at the national level. Primary products account for 70% of the corn production in Turkey while 30% is realized as the secondary product. Over the course of the past decade, practices and incentives encouraging corn production, the introduction of high-yielding varieties, mechanization and easy marketing opportunities supported corn cultivation fields and production. Yet the increasing droughts stand as the major threat for corn production in the future.

The starch based sugar sector, the other corn related industry, is controlled by the



state with production quota allocations as the state also control beet sugar production. The total production capacity of the starch based sugar industry is about 1.5 million tonnes for which 60% is typically used from domestic corn production annually. The quotas are announced by the state annually.

Sugar beet production for Turkey is 18.1 million tonnes in 2019 on 310,000 hectares land. Even though Turkey's sugar beet production fluctuated substantially in recent years, it tended to increase through 2015-2020 period heading to 19.0 million tonnes. Production of sugar beets, and consequently sugar, is limited by quotas in Turkey, set latest by a Presidential Decree of December 2019.

Turkey produces sugar from sugar beets in most regions, but the majority of production comes from the Central

Anatolia region. There are more than typically negatively affect yields.

The reduction in production since 2017 is linked to the privatization process of the sugar factories, as there was a considerable switch from sugar beet to other crops due to farmers' concerns about the lack of possible buyers in the vicinity of their region during the privatization process.

Turkey is a significant sugar consumer and with its 83.5 million population the sweets and confectionary sectors are developing steadily. According to beet sugar producers, Turkey's annual per capita consumption of total sugar is estimated to be 30 kg. An estimated 80% of beet sugar is consumed by industry and 20% by households.



Turkey's raw **cotton** production was 2.2 million tonnes in 2019 on roughly cultivated on 350,000 hectares. The yield in the South Eastern (GAP) region affects production on the upside based on weather conditions. The volatility in production and the recent drop in planting areas are due to prices, inflated costs, uncertainty created by COVID-19, better returns from alternative crops as well as to low subsidies from the government and the third-year rotation rule. The Turkish Ministry of Agriculture and Forestry (MinAF) bans some producers from plating

cotton and the failure to entitle for state subsidies as the same crop can't be subsidized on the same land three years in a row hinders the production level. Cotton consumption in Turkey has been estimated at 1.45 million tonnes while imports for the same period reached 1.0 million tonnes which is a record high amount in recent years.

The total **sunflowerseed** area estimate for Turkey is 720,000 hectares and production is estimated at 2.0 million tonnes as of 2019. 1.38 MMT of total production is oilseeds and the remainder is confectionary sunflowerseed and sowing seeds. There is strong demand for sunflowerseed oil in Turkey, due to large domestic consumption of sunflowerseed oil and exports, and Turkey continues to have a net deficit in sunflowerseed production to meet that demand. Turkey's strong demand drove continued imports of sunflowerseed and products. Turkey's sunflowerseed oil imports and exports went up significantly in 2019/20 due to increasing activity in refining and re-exporting which is expected to continue in 2020/21.

Sunflowerseed planting competes with other crops such as wheat, canola and corn for various regions hence the planted area of sunflowerseed can vary being dependent on farmers' planting decisions and the expected prices of alternative crops. The average oil content of local sunflowerseed has been increasing in recent years because of advances in seed quality.

Sunflowerseed oil is the most consumed oil in Turkey and the most popular cooking oil among households. Higher sunflowerseed oil consumption is due to the increase in population and the lack of



alternative low-priced oils because Turkey has not approved any genetically engineered corn or soybeans for food use. The government of Turkey regulates the market with regular adjustments in tariffs and reference prices that help drive steady increases in consumption and prevent illegal mixing of other cheaper priced oils with sunflowerseed oil.

To meet Turkish demand for sunflowerseed oil, Turkey imports a significant amount of crushing sunflowerseed and crude sunflowerseed oil. Local sunflowerseed production only meets about 2/3rds of the domestic sunflowerseed oil consumption needs, and Turkey has a very large crushing capacity, about 9.0 million tonnes for all oilseeds. Hence, Turkey's import regime favors seed imports over crude oil imports for local use.

// Figure 19. Oil Seeds Production and Productivity, (2009-2019)

| | Sunflower | | | | | | | | | | | | |
|----------------------------|---------------|-----------|---------|-----------|---------------|---------|-----------|----------|-------------|------------|-------------|-------------|--------|
| | Total Soybean | Groundnut | Total | For oil | For appetizer | Sesame | Safflower | Rapeseed | Cotton seed | Flax(seed) | Hemp (seed) | Poppy(seed) | |
| Production (Tonnes) | | | | | | | | | | | | | |
| 2009 | 2 396 044 | 38 442 | 90 081 | 1 057 125 | 960 300 | 96 825 | 21 036 | 20 076 | 113 886 | 1 021 200 | 1 | 3 | 34 194 |
| 2010 | 2 969 477 | 86 540 | 97 310 | 1 320 000 | 1 170 000 | 150 000 | 23 460 | 26 000 | 106 450 | 1 272 800 | 0 | 7 | 36 910 |
| 2011 | 3 227 588 | 102 260 | 90 416 | 1 335 000 | 1 170 000 | 165 000 | 18 000 | 18 228 | 91 239 | 1 527 360 | 0 | 8 | 45 077 |
| 2012 | 3 138 361 | 122 114 | 122 780 | 1 370 000 | 1 200 000 | 170 000 | 16 221 | 19 945 | 110 000 | 1 373 440 | 13 | 4 | 3 844 |
| 2013 | 3 299 967 | 180 000 | 128 265 | 1 523 000 | 1 380 000 | 143 000 | 15 457 | 45 000 | 102 000 | 1 287 000 | 0 | 1 | 19 244 |
| 2014 | 3 508 640 | 150 000 | 123 600 | 1 637 900 | 1 480 000 | 157 900 | 17 716 | 62 000 | 110 000 | 1 391 200 | 0 | 1 | 18 223 |
| 2015 | 3 442 098 | 161 000 | 147 537 | 1 680 700 | 1 500 000 | 180 700 | 18 530 | 70 000 | 120 000 | 1 213 600 | 0 | 1 | 30 730 |
| 2016 | 3 480 629 | 165 000 | 164 186 | 1 670 716 | 1 500 000 | 170 716 | 19 521 | 58 000 | 125 000 | 1 260 000 | 0 | 1 | 18 205 |
| 2017 | 3 883 370 | 140 000 | 165 330 | 1 964 385 | 1 800 000 | 164 385 | 18 410 | 50 000 | 60 000 | 1 470 000 | 0 | 1 | 15 244 |
| 2018 | 4 009 495 | 140 000 | 173 835 | 1 949 229 | 1 800 000 | 149 229 | 17 437 | 35 000 | 125 000 | 1 542 000 | 0 | 3 | 26 991 |
| 2019 | 3 985 412 | 150 000 | 169 328 | 2 100 000 | 1 950 000 | 150 000 | 16 893 | 21 883 | 180 000 | 1 320 000 | 0 | 20 | 27 288 |
| Yield (kg/decare) | | | | | | | | | | | | | |
| 2009 | - | 365 | 356 | 181 | 186 | 140 | 75 | 93 | 347 | 243 | 50 | 45 | 70 |
| 2010 | - | 369 | 354 | 206 | 212 | 167 | 74 | 193 | 341 | 265 | - | 32 | 71 |
| 2011 | - | 387 | 355 | 204 | 210 | 165 | 68 | 138 | 340 | 282 | - | 57 | 82 |
| 2012 | - | 386 | 328 | 227 | 238 | 170 | 56 | 128 | 372 | 281 | 72 | 63 | 28 |
| 2013 | - | 416 | 357 | 250 | 265 | 160 | 62 | 154 | 328 | 285 | - | 143 | 60 |
| 2014 | - | 437 | 371 | 249 | 268 | 150 | 67 | 140 | 342 | 297 | - | 100 | 61 |
| 2015 | - | 438 | 391 | 245 | 264 | 155 | 66 | 162 | 342 | 280 | - | 100 | 50 |
| 2016 | - | 432 | 389 | 232 | 243 | 165 | 67 | 147 | 353 | 303 | - | 40 | 61 |
| 2017 | - | 442 | 394 | 252 | 264 | 167 | 66 | 183 | 363 | 293 | - | 42 | 64 |
| 2018 | - | 426 | 392 | 265 | 277 | 174 | 67 | 142 | 330 | 297 | - | 51 | 60 |
| 2019 | - | 425 | 399 | 279 | 288 | 196 | 68 | 138 | 343 | 276 | - | 37 | 40 |

Source: Ministry of Agriculture and Forestry

A6.2 // Organic Agricultural Production

Organic agriculture is a form of farming system that aims to preserve diversity and maintain healthy agroecosystems based on inspection and certification of the value chain according to valid standards set by the government in Turkey.

Turkey's organic agricultural production dates back to late 1990's upon demand from EU based importers. Organic agriculture system was officially initiated with the regulation adopted in 1994. The Law was enforced in 2004 and the regulation was revised in 2010. Organic farming has been supported as a state policy since 2009 that laid the ground for rapid development engaging a higher

number of farmers each year. The legislation on organic farming is very similar to that of the EU and aims to align with the changes in the EU since the major export market is also the EU.

Dried fruits, nuts, medicinal and aromatic plants, cotton and olive oil, are among Turkey's major organically produced agricultural export commodities since the initial stage of organic farming. Demand was led by Germany as Turkey's main destination for its organic products however the North American organic market is now an equally important market as the European market.

Turkish organic food producers are able to meet the international standards demanded by the markets and hence are able to export at world-wide level. The number of countries where Turkish organic products are exported include the US and the EU Member States as the major

destinations. The United Kingdom, Japan, Canada, Australia, China and the Turkish Republic of Northern Cyprus are the other countries where Turkish organic products are exported.

As export demand led organic food production in Turkey, local demand flourished in time. Yet domestic markets for organic products developed rather late following the efforts of the NGOs and the

introduction of subsidies.

Consumerism that shaped healthier food demand accelerated the trend. As of 2020, along with contracted farming targeting export demand, domestic markets are going through a rising organic food demand. The required know-how, special inputs, certification cost still stand as barriers to entry for the organic agriculture in Turkey.

// Figure 20. Organic Crop Production, (2001-2019)

| | Number of crops | Number of holdings | | Area | | Production | |
|------|-----------------|--------------------|-------|----------|-------|------------|-------|
| | Number | Number | (%) | Hectares | (%) | Tonnes | (%) |
| 2002 | 150 | 12 428 | - | 89 827 | - | 310 125 | - |
| 2003 | 179 | 14 798 | 19,1 | 113 621 | 26,5 | 323 981 | 4,5 |
| 2004 | 174 | 12 751 | -13,8 | 209 573 | 84,4 | 377 616 | 16,6 |
| 2005 | 205 | 14 401 | 12,9 | 203 811 | -2,7 | 421 934 | 11,7 |
| 2006 | 203 | 14 256 | -1,0 | 192 789 | -5,4 | 458 095 | 8,6 |
| 2007 | 201 | 16 276 | 14,2 | 174 283 | -9,6 | 568 128 | 24,0 |
| 2008 | 247 | 14 926 | -8,3 | 166 883 | -4,2 | 530 224 | -6,7 |
| 2009 | 212 | 35 565 | 138,3 | 501 641 | 200,6 | 983 715 | 85,5 |
| 2010 | 216 | 42 097 | 18,4 | 510 033 | 1,7 | 1 343 737 | 36,6 |
| 2011 | 225 | 42 460 | 0,9 | 614 618 | 20,5 | 1 659 543 | 23,5 |
| 2012 | 204 | 54 635 | 28,7 | 702 909 | 14,4 | 1 750 127 | 5,5 |
| 2013 | 213 | 60 797 | 11,3 | 769 014 | 9,4 | 1 620 466 | -7,4 |
| 2014 | 208 | 71 472 | 17,6 | 842 216 | 9,5 | 1 642 235 | 1,3 |
| 2015 | 197 | 69 967 | -2,1 | 515 268 | -38,8 | 1 829 291 | 11,4 |
| 2016 | 238 | 67 878 | -3,0 | 523 777 | 1,7 | 2 473 600 | 35,2 |
| 2017 | 214 | 75 067 | 10,6 | 543 033 | 3,7 | 2 406 606 | -2,7 |
| 2018 | 213 | 79 563 | 6,0 | 626 885 | 15,4 | 2 371 612 | -1,5 |
| 2019 | 213 | 74 545 | -6,3 | 545 870 | -12,9 | 2 030 466 | -14,4 |

Source: Ministry of Agriculture and Forestry

Organic farming was performed in 74 545 holdings from all regions as of 2019. Around 3% of the total agricultural area is certified as organic which is slightly above the world average. Organic certified land for wild harvest is around 545 870 hectares. Organic farming is mainly practiced for food and beverage production; however, it is not limited with those. Organic textiles, cosmetics, fertilizers and pharmaceutical sectors are developing as complementary new opportunities.

Major activity is plant production including annual and perennial crops and grassland. On raw material basis, 214 crops are produced as wheat, olive, hazelnut, walnut, pistachio, dried fig, dried apricot, raisins, legumes, medical aromatic plants, cotton, berries and fresh fruits and vegetables. Among the main organic processed products in Turkey are fruit juices and concentrates, frozen fruits and vegetables, milk and dairy products, meat and meat products, baby food and olive oil.

A6.3 // Poultry and Products

Chicken is the most popular meat in Turkey. It also is the most affordable meat, particularly compared to beef and lamb - the high prices of which are still among the hot topics in the country.

During COVID-19 measures the only product which has not seen price increases is poultry meat, despite the high input costs. Up until April 2020, poultry meat prices posted 11% increase over the previous year in parallel with Turkey's high inflation. Yet, prices have decreased after Covid-19 pandemic peaked in March due to the sector's high stocks during the Covid-19 pandemic.

Turkish poultry producers note that the wholesale markets were the most affected

sector during the 13-week lockdown period due to the Covid-19 pandemic measures while in-home consumption has increased. However, total consumption was hit with COVID-19 related bans on open air picnics and hotel services as the chicken breast meat was hit the hardest being the most used at fast food



restaurants. Looking forward, producers believe that there would be no significant change in total overall domestic poultry consumption in Turkey for 2020 given the price ratio benefits compared to beef and lamb meet.

// Figure 21. Poultry animals slaughtered Poultry Meat Produced, (2009-2019)

| | Chickens | | Turkeys | |
|------|-------------------------------|-------------|-------------------------------|-------------|
| | Number of slaughtered animals | Meat tonnes | Number of slaughtered animals | Meat tonnes |
| 2009 | 717 401 256 | 1 293 315 | 2 981 847 | 30 242 |
| 2010 | 843 897 793 | 1 444 059 | 3 656 578 | 31 965 |
| 2011 | 963 245 455 | 1 613 309 | 4 043 525 | 36 331 |
| 2012 | 1 047 782 683 | 1 723 919 | 4 764 322 | 41 931 |
| 2013 | 1 060 673 395 | 1 758 363 | 4 574 443 | 39 627 |
| 2014 | 1 109 742 317 | 1 894 669 | 5 174 055 | 48 662 |
| 2015 | 1 118 719 413 | 1 909 276 | 5 359 763 | 52 722 |
| 2016 | 1 101 571 912 | 1 879 018 | 4 663 446 | 46 501 |
| 2017 | 1 228 444 095 | 2 136 734 | 5 218 613 | 52 363 |
| 2018 | 1 228 533 262 | 2 156 671 | 6 778 909 | 69 536 |
| 2019 | 1 207 088 021 | 2 138 451 | 6 188 060 | 59 640 |

Source: Ministry of Agriculture and Forestry

As of 2020, Turkey has 7,807 broiler production facilities. In 2019, Turkey produced 2.1 million tonnes of chicken meat and 59,000 tonnes of turkey meat, totaling 2.19 million metric tons of poultry meat. In 2019, production decreased 0.8% from 2018 (2.1 million tonnes) due to high feed prices.

Feed is the main input for poultry operations.

Feed prices are dependent on import and exchange rates which have been continuing to increase during the beginning of 2020. The volatility of the Turkish lira since mid-2018 and the accompanying economic turmoil since then create short-term hardship for poultry producers. Turkey had an average yearly 8% production growth rate in the poultry sector over the last decade. For the last three years, the normal growth rate has been only 5% and is expected to be the same for the future projections. High feed prices and lack of additional capacity in slaughterhouses account for the stagnation in production growth.

Turkish poultry producers generally increase their production in March and April due to picnic season and the Ramadan Holiday. In 2020, Turkish

producers faced the COVID-19 pandemic during the high-season months. Measures taken by the government such as lockdowns, closing hotels and restaurants etc., created overstocks in production. Feed costs account for 70% of the total expenditure in poultry operations. The main inputs for feed production are corn and soy. In 2019, corn imports increased 69% over 2018 and half of the total corn imports in 2019 were from Ukraine.

Romania and Russia are the top exporters after Ukraine, while Russia was the biggest corn exporter to Turkey in 2018. Turkey imports soybeans mostly from Brazil and Ukraine. As of June 2020, Turkey imported 60% more soybeans from Brazil than compared with the same period of the previous year.

The dependency on imports for corn, soy and fish meal to be used for production and the necessity of imported breeding materials such as hatching eggs and day-old chicks makes the Turkish poultry sector less competitive than other countries' poultry operations.

Turkey's restrictive biosafety law limits imports of genetically engineered feed and puts financial responsibility and criminal and civil liability on importers.

// Figure 22. Chicken Meat Prices and Feed Prices, Comparison 2015-2019

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------------------|------|------|------|------|------|
| Chicken Meat(TL/kg) | 5,09 | 5,37 | 6,04 | 6,27 | 7,88 |
| Broiler Meat Feed(TL/kg) | 1,21 | 1,19 | 1,38 | 1,79 | 2,08 |
| Full Fat Soy(TL/kg) | 1,34 | 1,39 | 1,61 | 2,32 | 2,38 |
| Corn(TL/kg) | 0,71 | 0,73 | 0,84 | 0,95 | 1,17 |

Source: Ministry of Agriculture and Forestry

In 2020 egg production is estimated to reach 2.0 billion units which is almost the same as 2019's 1.98 billion units. The Turkish egg sector is also struggling with high feed input prices and problems in their main export market, Iraq. At the beginning of May 2019, the Iraqi government stopped all egg imports from Turkey in order to protect its domestic production.

Turkey exports one-third of its total domestic egg production to foreign markets, and 80% of total egg exports were sent to Iraq. Following the Iraq ban, Turkish egg exporters focused on Syria and Kuwait. Eggs that could no longer be exported were directed to domestic markets. The occurring oversupply sharply pulled down the egg prices in the domestic market as an initial reaction.

// Figure 23. Hen Eggs Production

| | Hen eggs Thousand |
|------|----------------------|
| 2009 | 13 832 726 |
| 2010 | 11 840 396 |
| 2011 | 12 954 686 |
| 2012 | 14 910 774 |
| 2013 | 16 496 751 |
| 2014 | 17 145 389 |
| 2015 | 16 727 510 |
| 2016 | 18 097 605 |
| 2017 | 19 281 196 |
| 2018 | 19 643 711 |
| 2019 | 19 898 126 |

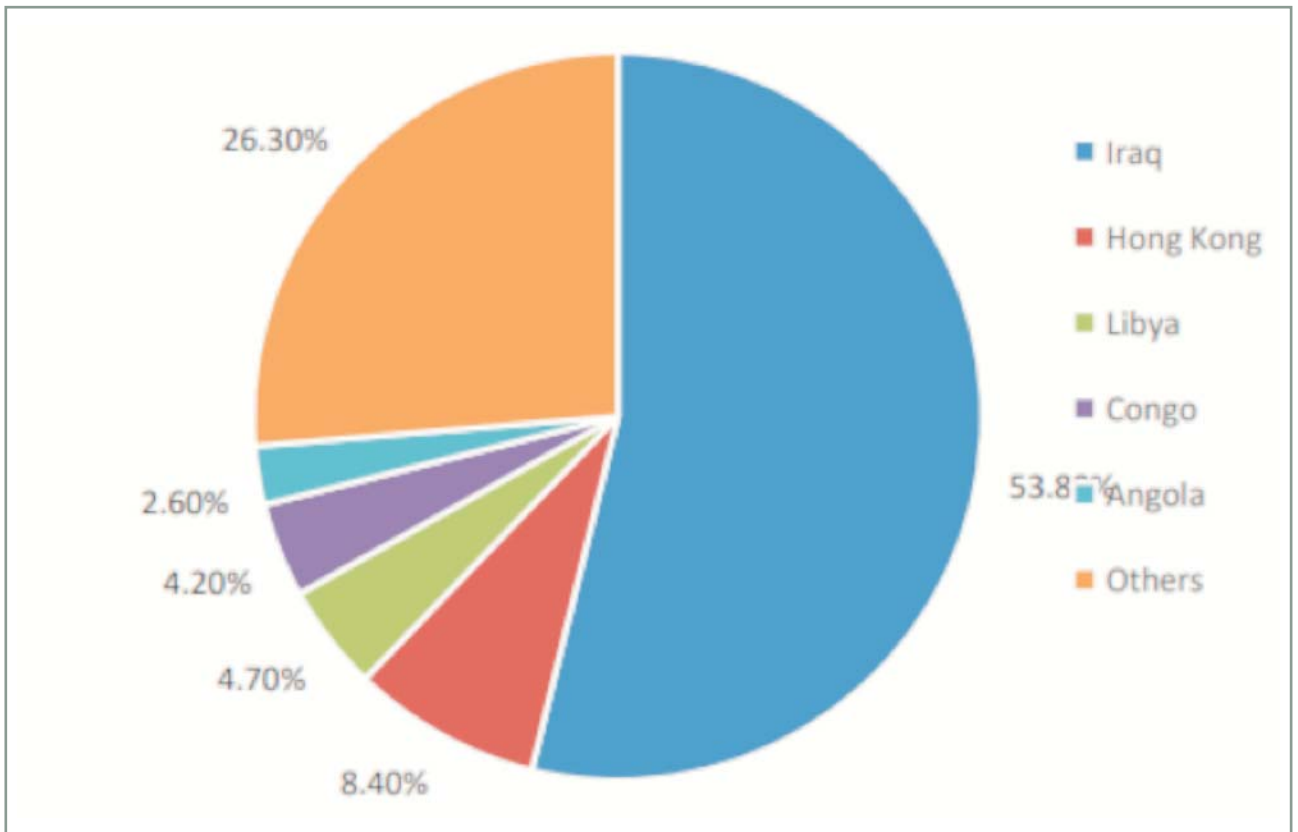
Source: Ministry of Agriculture and Forestry

Besides Iraq, the biggest chicken meat export market for Turkey, exports to other countries are changing due to political and economic reasons.



In 2018, Libya was the second biggest chicken meat export market; however, Hong Kong has risen to second place in 2019. Turkey has increased its chicken meat exports to Uzbekistan, Laos, and Congo while it has decreased them for Libya, Vietnam, and the United Arab Emirates. Turkey exported 247,183 tonnes of chicken meat to Iraq in 2019, which is flat over 2018. The most popular exported products to Iraq in 2019 were whole and cut-pieced frozen chickens at 170,000 tonnes. In 2019, the export of cut-pieced frozen chickens and prepared or preserved chicken meat increased due to Iraqi customer preferences, but Turkish poultry exporters think that the unit prices were still too low. Still, Turkish exporters are willing to sell for lower prices in order to maintain their market share.

// Figure 24. Turkish Chicken Meat Export Markets, Percentages by Top Countries



Source: Ministry of Agriculture and Forestry, Turkstat, USDA

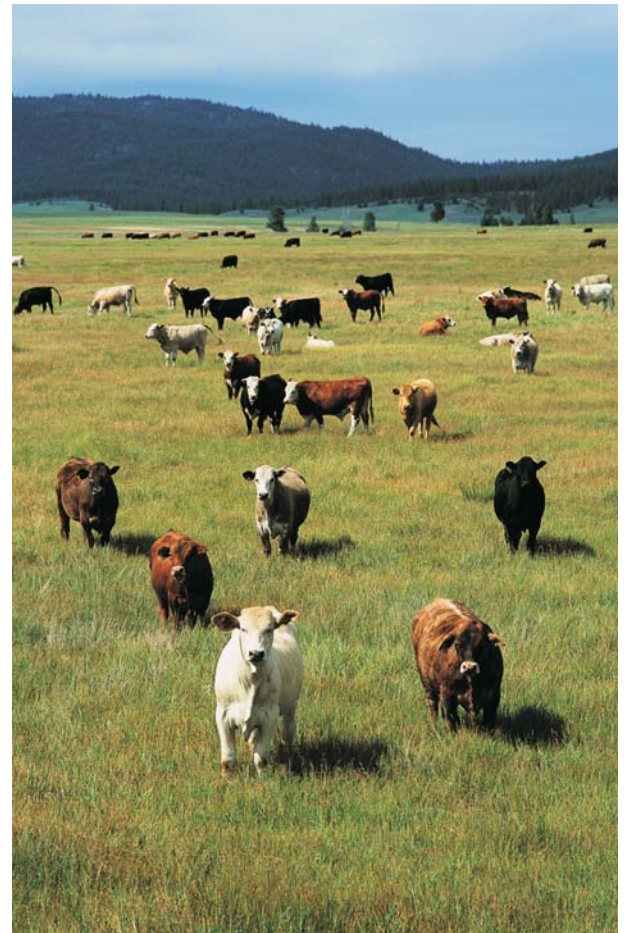
The main problems affecting Turkey's chicken meat exports are political and economic turmoil in neighboring Middle Eastern countries, logistics issues with Syria and Iraq. The Iraqi government's unexpected introduction of tariffs especially negatively affected the potential of Turkish poultry exports. Yet still Turkey managed to post 12% hike in poultry export in 1H20 following a significant slide in April and May after the Covid-19 pandemic complicated transport logistics to importing countries.

As regional turmoil created exporting difficulties for the Turkish poultry sector, Turkish exporters have been tapping more stable markets like Japan and China. Though such efforts progress very slowly hit by COVID-19 producers that calls for enhanced safety measures.



A 6.4 // Livestock, Milk and Products

Turkstat announced that the cattle population in 2019 was estimated at 17.8 million head including buffalo, which is 3% percent higher than 2018. The sheep and goat population was estimated at 48.4 million head in 2019, a 4% growth over 2018. As a result of the Ministry of Agriculture and Forestry (MinAF) subsidy policies for livestock production, especially for calves, and other grant programs for new construction of livestock barns to encourage farmers to continue their operations in spite of economic fluctuations, Turkey's cattle stock is expected post 2-3% increase.



// Figure 25. Livestock Numbers and Selected Products, 2001-2019

| | (Head) | | | | (Tonnes) | | | | |
|------|------------|------------|------------|------------|-----------|------------|--------------|---------------------|--------------|
| | Cattle | Sheep | Goats | Total | Meat | Milk | Chicken meat | Hen eggs (Thousand) | Honey (Tons) |
| 2001 | 10 548 000 | 26 972 000 | 7 022 000 | 44 542 000 | 435 778 | 9 495 550 | 614 745 | 10 575 046 | 60 190 |
| 2002 | 9 803 498 | 25 173 706 | 6 780 094 | 41 757 298 | 420 595 | 8 408 568 | 696 187 | 11 554 910 | 74 554 |
| 2003 | 9 788 102 | 25 431 539 | 6 771 675 | 41 991 316 | 366 962 | 10 611 011 | 872 419 | 12 666 782 | 69 540 |
| 2004 | 10 069 346 | 25 201 155 | 6 609 937 | 41 880 438 | 447 154 | 10 679 406 | 876 774 | 11 055 557 | 73 929 |
| 2005 | 10 526 440 | 25 304 325 | 6 517 464 | 42 348 229 | 409 423 | 11 107 897 | 936 697 | 12 052 455 | 82 336 |
| 2006 | 10 871 364 | 25 616 912 | 6 643 294 | 43 131 570 | 438 530 | 11 952 099 | 917 659 | 11 733 572 | 83 842 |
| 2007 | 11 036 753 | 25 462 293 | 6 286 358 | 42 785 404 | 575 622 | 12 329 789 | 1 068 454 | 12 724 959 | 73 935 |
| 2008 | 10 859 942 | 23 974 591 | 5 593 561 | 40 428 094 | 482 458 | 12 243 040 | 1 087 682 | 13 190 696 | 81 364 |
| 2009 | 10 723 958 | 21 749 508 | 5 128 285 | 37 601 751 | 412 621 | 12 542 186 | 1 293 315 | 13 832 726 | 82 003 |
| 2010 | 11 369 800 | 23 089 691 | 6 293 233 | 40 752 724 | 780 718 | 13 543 674 | 1 444 059 | 11 840 396 | 81 115 |
| 2011 | 12 386 337 | 25 031 565 | 7 277 953 | 44 695 855 | 776 915 | 15 056 211 | 1 613 309 | 12 954 686 | 94 245 |
| 2012 | 13 914 912 | 27 425 233 | 8 357 286 | 49 697 431 | 915 844 | 17 401 262 | 1 723 919 | 14 910 774 | 89 162 |
| 2013 | 14 415 257 | 29 284 247 | 9 225 548 | 52 925 052 | 996 125 | 18 223 713 | 1 758 363 | 16 496 751 | 94 694 |
| 2014 | 14 223 109 | 31 140 244 | 10 344 936 | 55 708 289 | 1 008 272 | 18 630 859 | 1 894 669 | 17 145 389 | 103 525 |
| 2015 | 13 994 071 | 31 507 934 | 10 416 166 | 55 918 171 | 1 149 262 | 18 654 682 | 1 909 276 | 16 727 510 | 108 128 |
| 2016 | 14 080 155 | 30 983 933 | 10 345 299 | 55 409 387 | 1 173 042 | 18 489 161 | 1 879 018 | 18 097 605 | 105 727 |
| 2017 | 15 943 586 | 33 677 636 | 10 634 672 | 60 255 894 | 1 126 403 | 20 699 893 | 2 136 734 | 19 281 196 | 114 471 |
| 2018 | 17 042 506 | 35 194 972 | 10 922 427 | 63 159 905 | 1 118 695 | 22 120 716 | 2 156 671 | 19 643 711 | 107 920 |
| 2019 | 17 688 139 | 37 276 050 | 11 205 429 | 66 169 618 | 1 201 469 | 22 960 379 | 2 138 451 | 19 898 126 | 109 330 |

Source: Turkey Feed Industrialist Association, August 2020, USDA

Turkey aims to increase sheep meat consumption as an alternative to beef since Turkey has had a beef deficiency for years and was forced to import beef meat in the past couple of years. There is a potential demand for high quality and variety of sheep meat products, especially for the luxury market, including for the new meat restaurants that have grown in popularity. Such products can also be marketed at high quality gourmet stores and premium supermarkets. Although the market is price sensitive for general consumption, there is potential for high quality niche sheep meat products.

To achieve this, MinAF grants some subsidies for sheep and goat producers; however, have hard time finding enough sheep meat as a result of migration to cities and the very limited sales of sheep meat at supermarkets where most urban consumer shop. To encourage sheep and goat producers, MinAF has begun reclamation of marginal crop land to instead be used for sheep and goat production.

Feed costs are still the biggest concern for livestock businesses In Turkey, accounting for 80% of total expenditures. Livestock producers complain about the

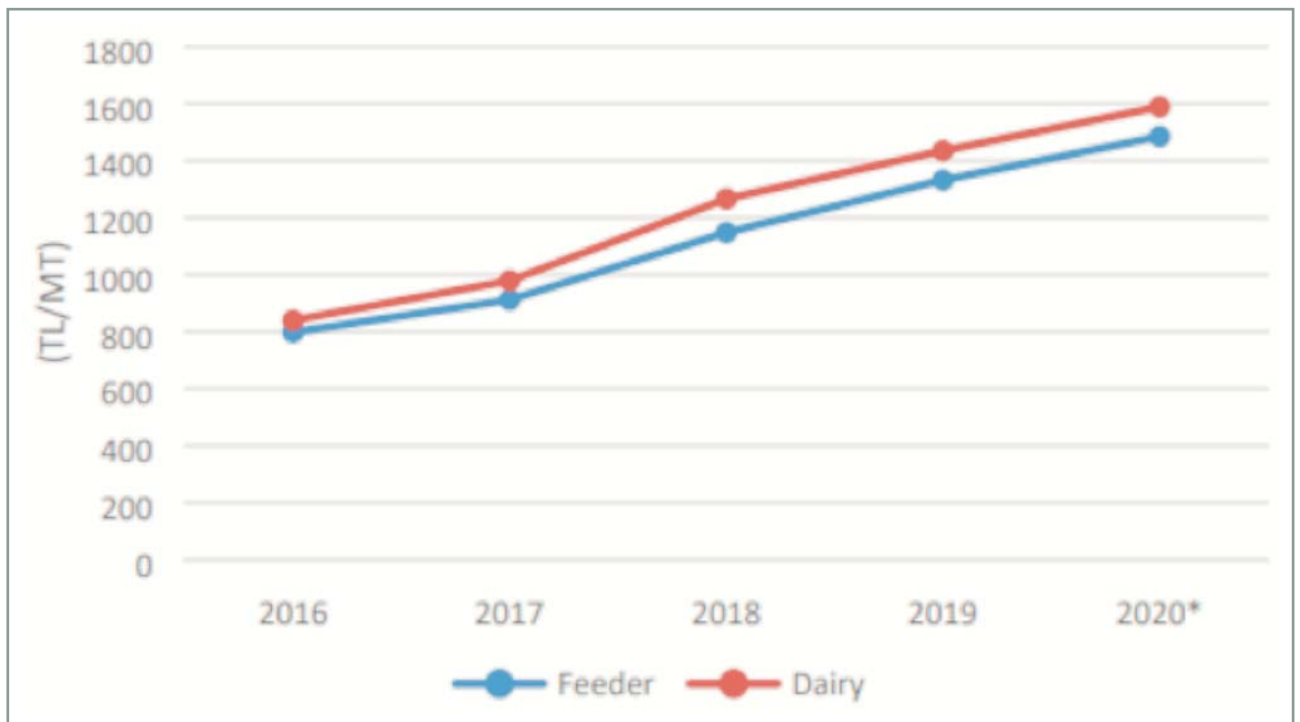
insufficient integration between livestock producers and feed producers noting that feed markets are unsteady. Another concern voiced is the lack of breeding strategies implemented by the government that may contribute to improved carcass and milk yield of animals.

In 2019, Turkey produced 24.9 million tonnes of mixed feed; with 14 million tonnes of raw feed material imported for this production. Since the beginning of the Covid-19 pandemic, imported feed costs have increased by 15% due to TL lira depreciation, exporting countries' stockpiling feed and logistic problems between countries. The exchange rate of the TL compared to the euro and dollar has been increasing continuously and specifically impacts imported raw materials mostly used for production of oilseeds, pulps, and bran production which is crucial for adequate animal nutrition.

Livestock producers agree that, meat and meat product prices in domestic markets will remain high and increase further due to dependency on the imported feed supply.

According to Turkstat, in June 2020 the largest price increase among agricultural products was animal feed which was 12.42% higher than the same month of the previous year. Turkish producers believe that government subsidies should be specifically focused on wheat, sunflower and corn, which are all grown domestically, instead of more expensive imported soy. Producers are also willing to graze their animals on open state grasslands during certain times of year to reduce costs; when available.

// Figure 26. Feed Prices Comparison (TL/MT), 2016-2020



Source: Turkey Feed Industrialist Association, August 2020, USDA

MinAF has announced that a “one-off grant” for feed will be given for small farmers who are struggling with supplying feed for their animals due to the sharp price increases during the Covid-19 pandemic period. With the Official Gazette dated on July 11 2020, 65 TL/per head (\$8.85) will be granted for a maximum 20 head of cattle (feeder and dairy) including buffalo, and 6.5 TL/per head (\$0.89) will be granted for a maximum 50 head of small ruminants.

On the other hand, raw milk prices set by the “National Milk Council” are too low and do not cover for all of the increased production costs. Producers want raw milk prices to reflect current feed prices, which are dependent on expensive imports.

Turkey produced 20.8 million tonnes of **raw milk** (including cow and buffalo milk) from 6.5 million head of milking cows in

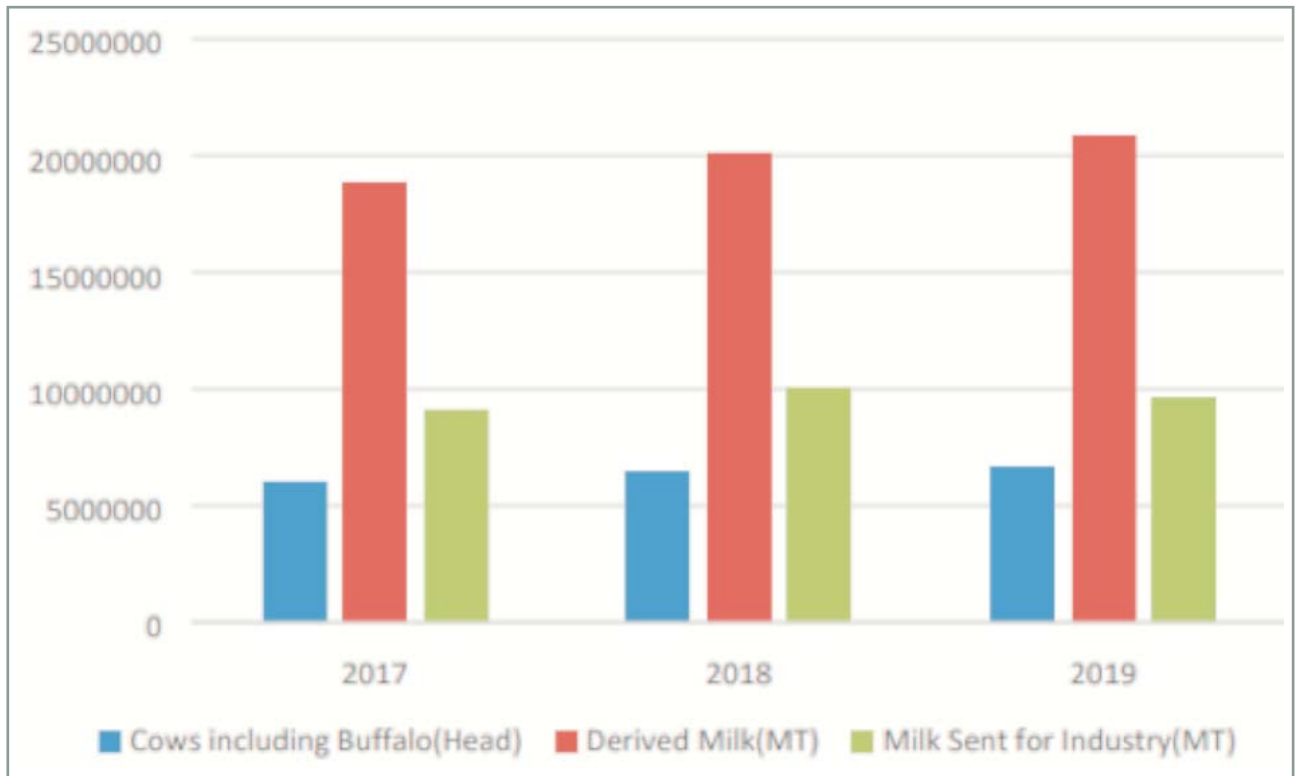


2019, which is 3.7% above that of 2018. 90% of total produced milk is derived from cows in Turkey, rather than sheep and goats.

However, only half of the total produced milk is sent to industry for further processing.

In 2019, only 9.5 million tonnes of raw milk was sent to industry for processing. The use of the remaining quantity is unknown and considered as unregistered milk. Most of this milk is used in homes in villages or unregistered local dairy production. As of 2019, there are 2,371 registered milk processing establishments in Turkey.

// Figure 27. Milking Animals, Derived Raw Milk and Milk Sent for the Industry, 2017-2019



Source: Ministry of Agriculture and Forestry, Turkstat, USDA

In 2019, Turkey imported 17,594 head of breeding cattle, which was 84% less than 2018, and 6,863 head of slaughtering cattle, which was 94% less than 2018. Additionally, Turkey imported 77,867 head of breeding sheep and goats in 2019, which is 58% less than 2018. Nearly 90% of total breeding sheep and goats was imported from Hungary. Turkey did not import any sheep and goats not intended for breeding in 2019, a dramatic decrease from the 239,897 head of non-breeding sheep and goats imported in 2018.

MinAF aims to lower Turkey's **livestock imports** starting from 2021 and to stop by 2022. According to MinAF, cattle production and meat production will be self-sufficient for the population as a result of government subsidies given to livestock producers. In 2020, cattle imports are estimated to be 350,000 head which is 46% less than 2019 when 689,076 head

46% less than 2019 when 689,076 head of feeder cattle valued at USD 672 million were imported.

MinAF argues that starting in 2022, producers will get breeding animals from the domestic market instead of imported animals. In Turkey there are the “heifer centers” that are facilities affiliated with MinAF to supply breeding animals to domestic producers. MinAF notes imports will be minimized based on “when needed” basis meaning that imports will be allowed if MinAF decides any specific breed is needed to improve animal genetic traits or there is an unexpected spike in cow meat prices.

Despite these policies to limit imports, the cattle population and beef production are not sufficient for the 83.5 million population. Counting in roughly 50 million tourists each year, low domestic feed

production and high feed input prices will keep meat prices high.

Following the peak of COVID-19 pandemic the ongoing normalization period means meat consumption might increase once restaurants and cafes start regular services. Nonetheless, even under the current circumstances meat production is already not high enough to meet demand at affordable prices.

Turkey imported feeder cattle mostly from Uruguay (33% share), Brazil (27% share) and the Czech Republic (11% share). Also, Turkey imported breeding cattle mostly from Germany (32% share), Austria (18%

share), and the Czech Republic (14% share). Slaughtering cattle was imported mostly from Uruguay (49% share), Brazil (40% share) and France (11% share) in 2019.

According to MinAF, Turkey exported 2,019 head of cattle to Iraq and Iran, consisting of 75 head of feeder cattle, 325 head of breeding cattle, and 1,616 head of slaughtering cattle in 2019. Also, Turkey exported 166,907 head of sheep and goat in 2019 mostly to Qatar and Lebanon, 900% more than 2018. In 2018 Turkey exported only 350 head of slaughtering cattle.

// Figure 28. Turkey Meat Production by Animal Categories, 2001-2019

| | Sheep | | Goat | | Cattle | |
|------|---------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|---------------------------------------|--------------------------------------|
| | Number of slaughtered animals (heads) | Quantity of meat production (tonnes) | Number of slaughtered animals (heads) | Quantity of meat production (tonnes) | Number of slaughtered animals (heads) | Quantity of meat production (tonnes) |
| 2001 | 4 747 268 | 85 661 | 879 127 | 16 138 | 1 843 320 | 331 589 |
| 2002 | 3 935 393 | 75 828 | 757 465 | 15 454 | 1 774 107 | 327 629 |
| 2003 | 3 554 078 | 63 006 | 607 006 | 11 487 | 1 591 045 | 290 455 |
| 2004 | 3 933 973 | 69 715 | 570 512 | 10 301 | 1 856 549 | 364 999 |
| 2005 | 4 145 343 | 73 743 | 688 704 | 12 390 | 1 630 471 | 321 681 |
| 2006 | 4 763 394 | 81 899 | 803 063 | 14 133 | 1 750 997 | 340 705 |
| 2007 | 6 428 866 | 117 524 | 1 256 348 | 24 136 | 2 003 991 | 431 963 |
| 2008 | 5 588 906 | 96 738 | 767 522 | 13 752 | 1 736 107 | 370 619 |
| 2009 | 3 997 348 | 74 633 | 606 042 | 11 675 | 1 502 073 | 325 286 |
| 2010 | 6 873 626 | 135 687 | 1 219 504 | 23 060 | 2 602 246 | 618 584 |
| 2011 | 5 479 546 | 107 076 | 1 254 092 | 23 318 | 2 571 765 | 644 906 |
| 2012 | 4 541 122 | 97 334 | 926 799 | 17 430 | 2 791 034 | 799 344 |
| 2013 | 4 958 226 | 102 943 | 1 340 909 | 23 554 | 3 430 723 | 869 292 |
| 2014 | 5 197 289 | 98 978 | 1 570 239 | 26 770 | 3 712 281 | 881 999 |
| 2015 | 5 008 411 | 100 021 | 1 999 241 | 33 990 | 3 765 077 | 1 014 926 |
| 2016 | 4 083 620 | 82 485 | 1 756 360 | 31 011 | 3 900 307 | 1 059 195 |
| 2017 | 5 134 338 | 100 058 | 2 068 866 | 37 525 | 3 602 115 | 987 482 |
| 2018 | 4 652 525 | 100 831 | 693 405 | 13 603 | 3 426 180 | 1 003 859 |
| 2019 | 5 057 026 | 109 382 | 836 376 | 16 536 | 3 633 730 | 1 075 479 |

Source: Turkstat

Turkey produced 1.0 million tonnes of meat in 2019 including buffalo, which is slightly higher than 2018, despite reduced feeder cattle imports. Turkish cattle producers point at high feed prices and unsustainable government policies as the main problem is slowing production. Slaughter prices were too low, and producers failed to meet expenses of raising animals. Also, the carcass yield of the animals is very low, approximately 270- 300 kg.

In 2020, **meat production** is estimated to be the same as 2019 due to shortage of quality feed supply due to the high prices, restrictive policies on feeder cattle imports, which were imposed at the end of 2019, and insufficient production policies which causes low carcass yields.

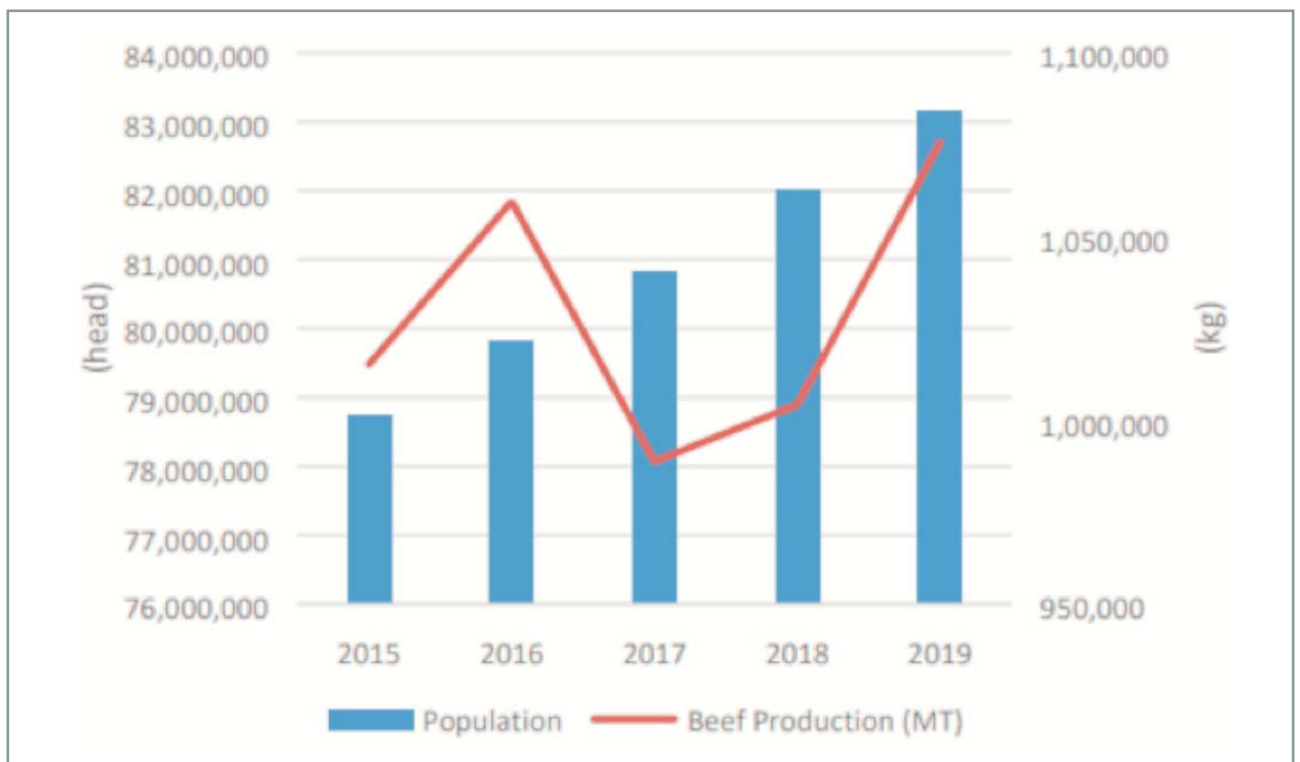
As a result of subsidies to be given for feeder calves and continuing dairy cow slaughters due to high feed prices and a low raw milk price, meat production in

2021, is estimated to be slightly higher than 2020 with a total of 1.2 million tonnes.

High feed prices and a shortage of hay reserves are forcing Turkish producers to keep herd sizes low and slaughter more animals since they cannot afford input prices. Hay prices have sharply increased in 2020, to 300% above that of in 2019. Less demand for meat from restaurants and cafes during their closures and limited reopenings during the COVID-19 pandemic also stand out as another reason for lower production recently.

The presence of animal diseases, especially foot and mouth disease (FMD), Brucellosis and Tuberculosis are other challenges for feeder cattle producers that negatively affect sustainable beef production. According to Turkish feeder cattle producers, they cannot afford raising beef cattle with slaughter prices which are mostly below the cost of production.

// Figure 29. Turkey Population versus Beef Production (kg), 2015-2019

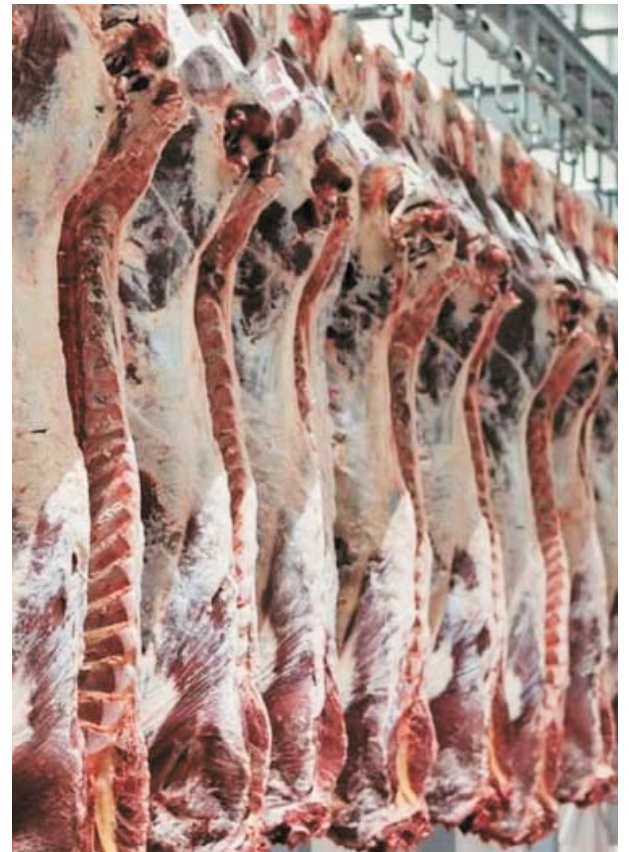
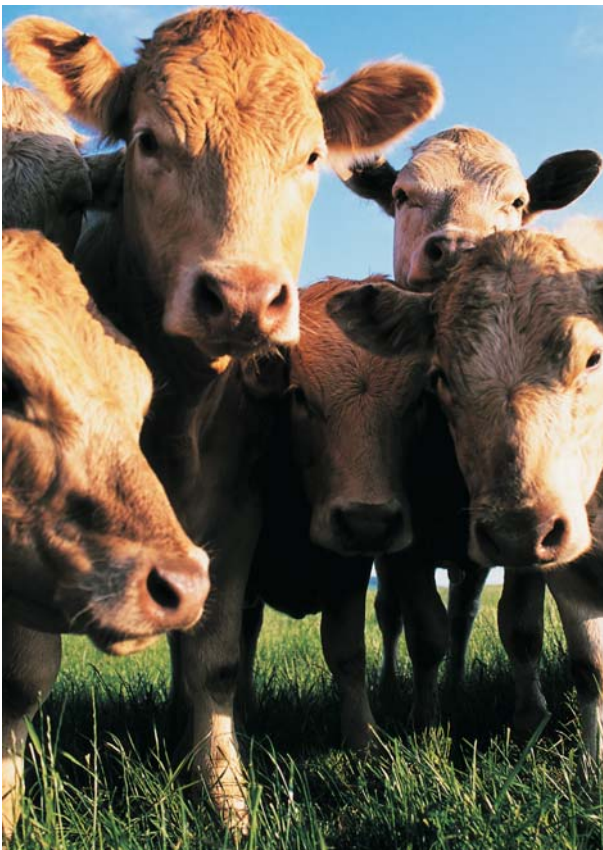


Source: Turkstat, USDA

The Turkish beef industry has not developed a carcass classifying and grading system, even within the scope of EU harmonization. This issue causes insufficient quality/price standards on beef consumption. According to Turkish producers, it also causes unfair competition between beef producing facilities.

As for consumption, the rising trend is local brands created by medium to large size farms.

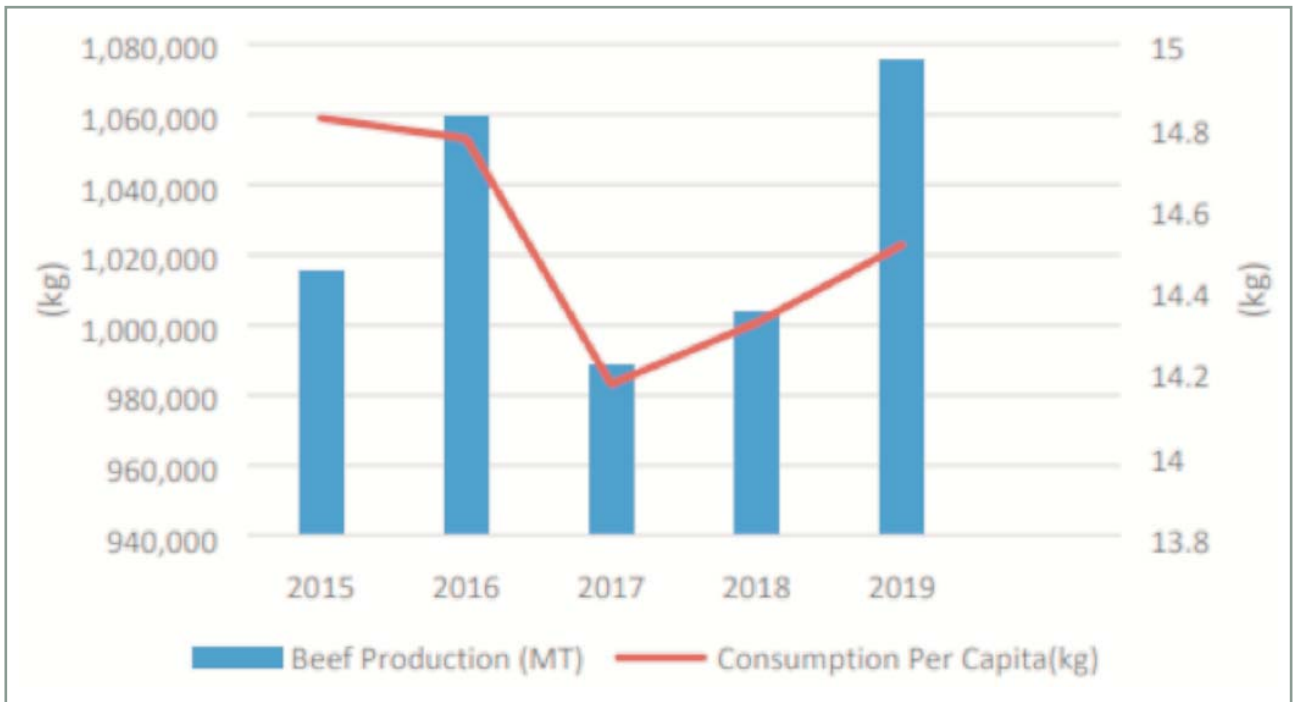
Local brands from directly farm to table have been increasing as consumer demand following COVID-19 shifted more towards online shopping or farm-to-door type of delivering. Such e-commerce for packaged meat products are able to reach customers who can afford to buy higher valued sheep and beef meat products, processed or semi-processed- leaving producers with higher margins through the elimination of wholesale store chains.



In 2020, beef consumption roughly at 14.5 kg per capita is the same as 2019 despite a growing population. The flatness has roots in continuing food inflation, high red meat prices, and weakening purchasing power. In 2021, beef consumption is expected to stagnate in correlation with unchanging production. Beef prices have increased at more than twice the rate of the country's inflation within 12-15% for the last two years. Insufficient increases in the animal population causes beef, sheep, beef and sheep product prices to significantly increase in the domestic market.

MinAF aims to increase sheep meat consumption as an alternative to beef and demand for sheep meat is to pick up gradually. While most of the local markets and supermarkets prefer to sell more beef meat compared to sheep meat; the rising e-commerce carves the way for costumers to reach sheep meet directly from brand creating farms.

// Figure 30. Turkey Beef Production (kg) versus Consumption per capita (kg), 2015-2019



Source: Turkstat, USDA

The pressure from domestic producers to limit cheaper imports turned effective and Turkey imported 6,552 CWT of meat in 2019, which is 89% less than 2018. All imported meat in 2019 was beef. In 2021, beef imports are forecast to decline further 10% more due to the Ministry's policy to drastically limit imports to protect domestic producers. As of May 2020, Turkey imported 608 CWT of beef and is forecast to reach 1,500 CWT in 2020.

Meat imports are typically introduced when the government wants to lower beef prices in Turkey. Currently, the state-controlled Meat and Milk Board (ESK) is the only entity granted authorization to import beef. However, it is hard to see any form of stabilization in Turkey's beef prices over the past five years. In 2019, Turkey imported beef mostly from Poland and Ukraine, while in 2020, Turkey has been importing beef from Serbia and Bosnia and Herzegovina within the scope of free trade agreements.



A 6.5 //

Fruits, Beverage and Spice Crops Production

In Turkey, about 75 fruit species, including 16 subtropical and 59 temperate zone fruit species and 60 vegetable species are commercially grown.

High level of adaptation to a specific agroecosystem helps to grow these species with low inputs mostly under rain-fed conditions. Typical examples are pistachio nut, hazelnut, figs and grapes.

Hazelnut production region is the northern Black Sea with high levels of precipitation. Pistachio production is concentrated at the southeastern Anatolia, in Gaziantep, Sanliurfa and Siirt Provinces where summer is very hot and dry and winter is cold. Fig trees are grown for commercial sun-drying of fruit in Aydin and Izmir Provinces for centuries. Seedless grapes utilized as dried are concentrated in Gediz valley where Mediterranean climate prevails.

In terms of export value, top ten fresh fruit and vegetables exported from Turkey, in the decreasing order are mandarins, lemon, tomatoes, grapes, cherries (sour and sweet), orange, pepper, pomegranate, peaches and grapefruit.



Turkey produces nearly 75% of the world hazelnut production and supplies 70-75% of the trade. Hazelnut is known to be produced for 2 300 years in northern Anatolia and exported from Turkey during the last six centuries. Hazelnut is a good raw material for the food industry. Around 80% is used in the chocolate industry; 10 to 12% in biscuit, pastry, and other bakery products; 3 to 4% is used as snacks, and the rest are used for ice-cream making and oil extraction.

In 2016/17 season, 235.8 thousand tonnes of hazelnut was exported at a value of USD 1.8 billion.



Apple is one of the most produced and traded fruit in Turkey and Turkey is the one of the largest producers of apples in Europe. Deciduous fruit producers usually run small operations; however, some large commercial orchards were established in recent years, which grow commercial varieties with better quality seedlings and modern agricultural methods. Most of the production in large and commercial orchards is exported as they concentrate on growing new varieties that are in high demand in foreign markets. Traditional low-yielding orchards are still a major part of Turkish apple production, so Turkey is not currently a prominent exporter of apples. Turkey's diverse geographic regions allow for the production of hundreds of varieties of apples, but only a few of these are marketed commercially.

Commercial orchards are generally located in the southern part of central Anatolia and the northern Mediterranean regions. Traditionally, about 80-90% of Turkey's apple production is consumed as fresh fruit. About 5% is processed into juice, canned products, vinegar or dried products, and about 5-10% is exported as fresh produce. Apples are one of the most preferred fresh fruits in Turkey due to their widespread access, traditional use, and large number of varieties. Through the use of controlled temperature storage facilities, apples can be marketed throughout the year. Current cold storage capacity in Turkey is more than 1 million metric tonnes and increasing yearly with new investments.



The pear production forecast for MY 2019/20 is up about 10 percent to 490,000 MT due to favorable weather conditions during the winter and spring seasons. Some large commercial orchards were established in recent years, which grow commercial varieties with better quality seedlings and modern agricultural methods, generally for export markets. Most of the production in large and commercial orchards is concentrated in new varieties that are in high demand in foreign markets. Many different varieties of pears are grown in Turkey and are harvested throughout the year.



Sun-dried fruit comprise a significant share among Turkish exports. In 2016 the share was 441.8 thousand tonnes worth USD 1.3 billion. Dried grapes, apricots and figs make up the bulk and contribute to the export value by 74%. Additionally, dried apple, dried plums, pine nuts, apricot kernels, pistachio nuts, almond and walnuts are also exported.

// Figure 31. Production of fruits, beverage and spice crops (For selected products), 2001-2019

| | Grapes | Apples | Olives | Strawberries | Apricots | Peaches | Oranges | Mandarin | Hazelnuts | Almonds | Theyme | Green tea | (Tonnes) |
|------|-----------|-----------|-----------|--------------|----------|---------|-----------|-----------|-----------|---------|--------|-----------|----------|
| 2001 | 3 250 000 | 2 450 000 | 600 000 | 117 000 | 470 000 | 460 000 | 1 250 000 | 580 000 | 625 000 | 42 000 | - | 824 946 | |
| 2002 | 3 500 000 | 2 200 000 | 1 800 000 | 145 000 | 315 000 | 455 000 | 1 250 000 | 590 000 | 600 000 | 41 000 | - | 791 700 | |
| 2003 | 3 600 000 | 2 600 000 | 850 000 | 150 000 | 460 000 | 470 000 | 1 250 000 | 550 000 | 480 000 | 41 000 | - | 869 000 | |
| 2004 | 3 500 000 | 2 100 000 | 1 600 000 | 155 000 | 320 000 | 372 000 | 1 300 000 | 670 000 | 350 000 | 37 000 | 7 000 | 1 105 000 | |
| 2005 | 3 850 000 | 2 570 000 | 1 200 000 | 200 000 | 860 000 | 510 000 | 1 445 000 | 715 000 | 530 000 | 45 000 | 6 400 | 1 192 004 | |
| 2006 | 4 000 063 | 2 002 033 | 1 766 749 | 211 127 | 460 182 | 552 775 | 1 535 806 | 791 255 | 661 000 | 43 285 | 7 979 | 1 121 206 | |
| 2007 | 3 612 781 | 2 457 845 | 1 075 854 | 250 916 | 557 572 | 539 435 | 1 426 965 | 744 339 | 530 000 | 50 753 | 5 350 | 1 145 321 | |
| 2008 | 3 918 442 | 2 504 494 | 1 464 248 | 261 078 | 716 415 | 551 906 | 1 427 156 | 756 473 | 800 791 | 52 774 | 10 082 | 1 100 257 | |
| 2009 | 4 264 720 | 2 782 365 | 1 290 654 | 291 996 | 660 894 | 547 219 | 1 689 921 | 846 390 | 500 000 | 54 844 | 12 329 | 1 103 340 | |
| 2010 | 4 255 000 | 2 600 000 | 1 415 000 | 299 940 | 450 000 | 539 403 | 1 710 500 | 858 699 | 600 000 | 55 398 | 11 190 | 1 305 566 | |
| 2011 | 4 296 351 | 2 680 075 | 1 750 000 | 302 416 | 650 000 | 545 902 | 1 730 146 | 872 251 | 430 000 | 69 838 | 10 953 | 1 231 141 | |
| 2012 | 4 234 305 | 2 888 985 | 1 820 000 | 351 834 | 760 000 | 611 165 | 1 661 111 | 874 832 | 660 000 | 80 261 | 11 598 | 1 250 000 | |
| 2013 | 4 011 409 | 3 128 450 | 1 676 000 | 372 498 | 780 000 | 637 543 | 1 781 258 | 942 226 | 549 000 | 82 850 | 13 658 | 1 180 000 | |
| 2014 | 4 175 356 | 2 480 444 | 1 768 000 | 376 070 | 270 000 | 608 513 | 1 779 675 | 1 046 899 | 450 000 | 73 230 | 11 752 | 1 266 311 | |
| 2015 | 3 650 000 | 2 569 759 | 1 700 000 | 375 800 | 680 000 | 642 727 | 1 816 798 | 1 156 365 | 646 000 | 80 000 | 12 992 | 1 327 934 | |
| 2016 | 4 000 000 | 2 925 828 | 1 730 000 | 415 150 | 730 000 | 674 136 | 1 850 000 | 1 337 037 | 420 000 | 85 000 | 14 724 | 1 350 000 | |
| 2017 | 4 200 000 | 3 032 164 | 2 100 000 | 400 167 | 985 000 | 771 459 | 1 950 000 | 1 550 469 | 675 000 | 90 000 | 14 477 | 1 300 000 | |
| 2018 | 3 933 000 | 3 625 960 | 1 500 467 | 440 968 | 750 000 | 789 457 | 1 900 000 | 1 650 000 | 515 000 | 100 000 | 15 895 | 1 480 534 | |
| 2019 | 4 100 000 | 3 618 752 | 1 525 000 | 486 705 | 846 606 | 830 577 | 1 700 000 | 1 400 000 | 776 046 | 150 000 | 17 965 | 1 407 448 | |

Source: Ministry of Agriculture and Forestry



Almost all of the **strawberry** production comes from small family farms. Nonetheless, the majority of strawberry growers employ modern intensive cultivation methods such as soilless cultures, raised beds, plastic mulch, and drip irrigation.



Cherry production and export are important enterprises in the western Aegean Region due to early ripening. As the market demand increased cherry harvest and marketing period extended further eastward with newly established orchards first to Isparta, then at the higher elevations of the Taurus mountains and east Anatolia. Cherries have various uses and rich genetic variation supports these

diversified uses. Sweet and sour cherry fruit are consumed as fresh or used in processing industry. Sour cherry fruits are dried mainly after removing the pit or fresh fruit are processed as jam or juice. Sweet cherry varieties with white or light pink color are sulphured and put in a brine solution for the confectionary industry.



Turkey is one of the world's major **raisin** producers and exporters with over 1,200 different grape varieties being grown in the country, making Turkey one of the genetic centers for grapes in the world.

Turkey produces approximately 4.0 million tonnes of fresh grapes for all purposes, including raisins. The Aegean region is the most important grape producer and mainly produces seedless grapes used for raisins. Table grapes make up about 50% of production, whereas drying grapes make up 35% and 15% is for alcoholic beverage (wine and raki) production. The Marmara region surrounding Istanbul as well as Central Anatolia and Southeast Anatolia produce table and wine grapes. Total plating area for all grapes is 405,000 hectares as of 2020 and dropped by around 10% in the past ten years mainly due to the decline table grape production.

More intensive cultivation and adoption of better irrigation techniques paved the way for a steady increase in seedless grape production since the 1990s due to.

Fluctuating year by year, seedless grape production averages about 1.2 million tonnes which constitutes around 35% of Turkey's total grape crop.

The use of irrigation systems in vineyards has increased in recent years with government support. Over half of the vineyards are drip irrigated. More than 80% of this production is dried with around 20% consumed fresh. One kilogram of raisins requires about 4 kilograms of fresh grapes.

Turkey is the world's leading raisin exporter accounting for about 40% of total global raisin exports. 80% of all

Turkey's raisin exports are headed to the European Union. The United Kingdom (60,000 tonnes), Germany (25,000 tonnes), and the Netherlands (21,000 tonnes) continue to be the top three importers of Turkish raisins as of 2019-2020. So far, Australia (10,900 tonnes), Canada (7,000 tonnes), and Japan (4,500 tonnes) stand as other main export destinations.

Licensed warehouse systems and their integration with commodity exchanges are developing in Turkey. The Izmir Commodity Exchange has a new licensed warehouse that was developed to prevent price decreases during the harvest season, and it is partially being used for raisins.

A6.6 // Fisheries and Products

Turkey is surrounded by four seas which give the country a rich and diverse coastline that supports many economic activities. With a total available water surface area of 26 million hectares and rivers with a total length of 177 714 km, Turkey has all the natural resources necessary for fish production.

Marine capture fishery makes up about 91% of total capture and amounted to 431,572 tonnes in 2019 from all the seas surrounding the country; the Mediterranean Sea, the Aegean Sea, the Black Sea, and the Sea of Marmara. The Black Sea is responsible for a little under three quarters of the annual catches.

Anchovy, pilchard, sprat, and horse mackerel are the main small pelagic species in terms of volume, which amounted to 85% of the marine catch in 2019. Caught primarily in the Black Sea, they are used almost exclusively in the production of fishmeal and fish oil, two of the main ingredients in fish feed. Fish caught for human consumption comes from all the seas surrounding Turkey, although the Black Sea catches are significantly higher than those from the other three regions, the Mediterranean Sea, the Aegean Sea, and the Sea of Marmara.

Inland capture fisheries produced about 31,596 tonnes in 2019, continuing the decreasing trend in catches seen over the past several years. The most important species are inci kefali (tarek) and gibel carp, which together make up half the production. Other important species are sand smelt, mullets common carp and land snail.



Aquaculture output has been on an increasing trend thanks to technological advances, combined with governmental strategy, and scientific know-how. The rapid growth of the aquaculture sector has made Turkey the leading producer in the Mediterranean Sea. Currently, it produces large quantities of European sea bass, gilthead sea bream, and rainbow trout. Turkish production extends also to the Black Sea, where sea-raised trout and European sea bass are cultivated. One of the typical characteristics of aquaculture in Turkey is that it is mostly based on intensive systems producing carnivorous fish species.

The total production of the Turkish aquaculture sector reached 373,356 tonnes in 2019. The main freshwater species is trout, which is almost all of total production.

In 2016, Turkey was the largest producer of farmed sea bass in the world and also the largest exporter of sea bass products globally. Nearly all the extra-EU imports of sea bass come from Turkey. Turkey is also one of the largest producers of sea bream in the world.



Domestic consumers in Turkey prefer fresh fish. Although, it is surrounded by seas, fish consumption in Turkey is low and is only half of the world average and one third of the average consumption in the EU. Turkish consumers have historically preferred meat products, and fish consumption differs between the regions. Whereas the fish consumption is little in inland areas, it is more predominant in coastal areas. Per capita consumption in 2017 was 5.5 kg, this was a slight increase from 2016, and however, there has been a general negative trend in consumption with a decrease of 2.5 kg or 32% since the turn of the century.



// Figure 32. Fishery Statistics, (2007-2019)

| <i>Tonnes</i> | Sea Products | Aquaculture Production | Freshwater Products |
|---------------|--------------|------------------------|---------------------|
| 2007 | 589 129 | 139 873 | 43 321 |
| 2008 | 453 113 | 152 186 | 41 011 |
| 2009 | 425 046 | 158 729 | 39 187 |
| 2010 | 445 680 | 167 141 | 40 259 |
| 2011 | 477 658 | 188 790 | 37 097 |
| 2012 | 396 322 | 212 410 | 36 120 |
| 2013 | 339 047 | 233 394 | 35 074 |
| 2014 | 266 078 | 235 133 | 36 134 |
| 2015 | 397 731 | 240 334 | 34 176 |
| 2016 | 301 464 | 253 395 | 33 856 |
| 2017 | 322 173 | 276 502 | 32 145 |
| 2018 | 283 955 | 314 537 | 30 139 |
| 2019 | 431 572 | 373 356 | 31 596 |

Source: Ministry of Agriculture and Forestry

In 2017 fish and fishery product total **exports** were worth USD 858 million, and **imports** USD 445 million. Processed fish is mainly going to the export markets as the domestic market prefers fresh fish. Farmed sea bass and sea bream are exported chilled or frozen as gutted or filleted, in vacuum-sealed trays; more recently, they have also been exported as frozen ready meals. Farmed rainbow trout is filleted and smoked for western markets.

Export of seafood includes crustaceans, molluscs, and cephalopods, which may be frozen, preserved, or chilled. The EU is Turkey's primary market for fish and seafood exports, but exports are increasing to Russia, the Middle East and even Asia and the US. The total exports of fisheries and aquaculture products increased account to roughly 27% of the total production as of 2019.

Norway is by far the main supplier for imports of fisheries and aquaculture products. Turkish imports include frozen mackerel and other small pelagic fish, salmonids, and cephalopods. Imports of fishmeal and fish oil are also significant due to the large demand for fish feed.

Conflicts between the marine aquaculture sector and other users of the coast, such as the tourism industry, were reduced significantly when fish farms were reallocated offshore. This move contributed to a growth in aquaculture production, which is projected to increase further to 600 000 tonnes, including trout, in 2023 with the help of freshwater cage production, the recent construction of dams and designation of the new marine aquaculture areas.

Well-developed research infrastructure, comprising a network of faculties,

departments, and laboratories at universities with links to the industry, provide a wealth of "know-how" as well as a supply of educated employees to promote the growth of the sector. New sectors like mussel and shrimp farming, which the government is keen to develop, will also play a role in the overall expansion in production. Certification to standards such as Global G.A.P, Friend of the Sea, and ISO 14000 are becoming widespread.

Threats to the sector are over-fishing, fleet overcapacity, poor environmental planning, and unregulated fishing.

Opportunities for increasing production in a sustainable manner are sought in the promotion of co-management schemes, stock assessment, monitoring control and surveillance (MCS), increased market access for Turkish fisheries products into the European Union (EU), and the development of recreational fisheries.

A6.7 // Dry Pulses

Pulses are the edible seeds of plants in the legume family. Dried peas, chickpeas,

dried beans, lentil, and cowpeas are all types of pulses, with lentils and chickpeas being the most popular in Turkey. Pulses, especially lentils, are commonly used in Turkish traditional dishes. Pulses production and planting area in Turkey have been declining for many years, especially between 2004 and 2014.

// Figure 33. Dry Pulses, (2009-2019)

| | Total | Broad bean | Pea | Chick pea | Bean (dry) | Lentil | | Kidney beans |
|----------------------------|-----------|---------------|-------|--------------|------------|---------|--------|-----------------|
| | | | | | | Red | Green | |
| Production (Tonnes) | | | | | | | | |
| 2009 | 1 101 348 | 21 150 | 3 604 | 562 564 | 181 205 | 275 050 | 27 131 | 3 017 |
| 2010 | 1 235 306 | 19 898 | 3 200 | 530 634 | 212 758 | 422 000 | 25 400 | 2 290 |
| 2011 | 1 131 986 | 19 678 | 3 628 | 487 477 | 200 673 | 380 000 | 25 952 | 2 149 |
| 2012 | 1 190 706 | 18 406 | 2 686 | 518 000 | 200 000 | 410 000 | 28 000 | 2 111 |
| 2013 | 1 147 735 | 17 826 | 3 235 | 506 000 | 195 000 | 395 000 | 22 000 | 2 112 |
| 2014 | 1 035 832 | 14 927 | 2 987 | 450 000 | 215 000 | 325 000 | 20 000 | 2 006 |
| 2015 | 1 079 048 | 13 856 | 3 125 | 460 000 | 235 000 | 340 000 | 20 000 | 1 609 |
| 2016 | 1 080 253 | 14 489 | 2 919 | 455 000 | 235 000 | 345 000 | 20 000 | 1 860 |
| 2017 | 1 163 805 | 14 746 | 2 673 | 470 000 | 239 000 | 400 000 | 30 000 | 1 511 |
| 2018 | 1 225 220 | 13 198 | 2 603 | 630 000 | 220 000 | 310 000 | 43 000 | 1 443 |
| 2019 | 1 230 281 | 12 346 | 2 193 | 630 000 | 225 000 | 310 000 | 43 631 | 1 392 |

Source: Ministry of Agriculture and Forestry

Total pulses production was 1.2 million tonnes in 2019, down from about 2.0 million tonnes in the 1990s. The planting area normally changes depending on the availability of seeds, prices and premiums of the previous year's harvest, weather conditions, fertilizer prices, plant diseases, etc.

Competition from other crops in pulses growing areas has led to declining pulses planting area. Another reason for declining pulses planting area is farmers switching to less labor-intensive products with the improvement of irrigation such as corn, cotton and sugar beet.



Chickpea is the most common pulse produced in Turkey, making up 51% of total Turkish pulses production. Lentils make up around 29% of Turkish pulses production.

Turkey primarily imports lentils from Canada and exports them to the Middle

East and Africa. Iraq, Sudan, Egypt and Saudi Arabia are respectively the main export markets for Turkey making up more than half of total pulses exports. Turkey has not approved any genetically engineered traits for food including lentils as such imports violate the Biosafety Law.

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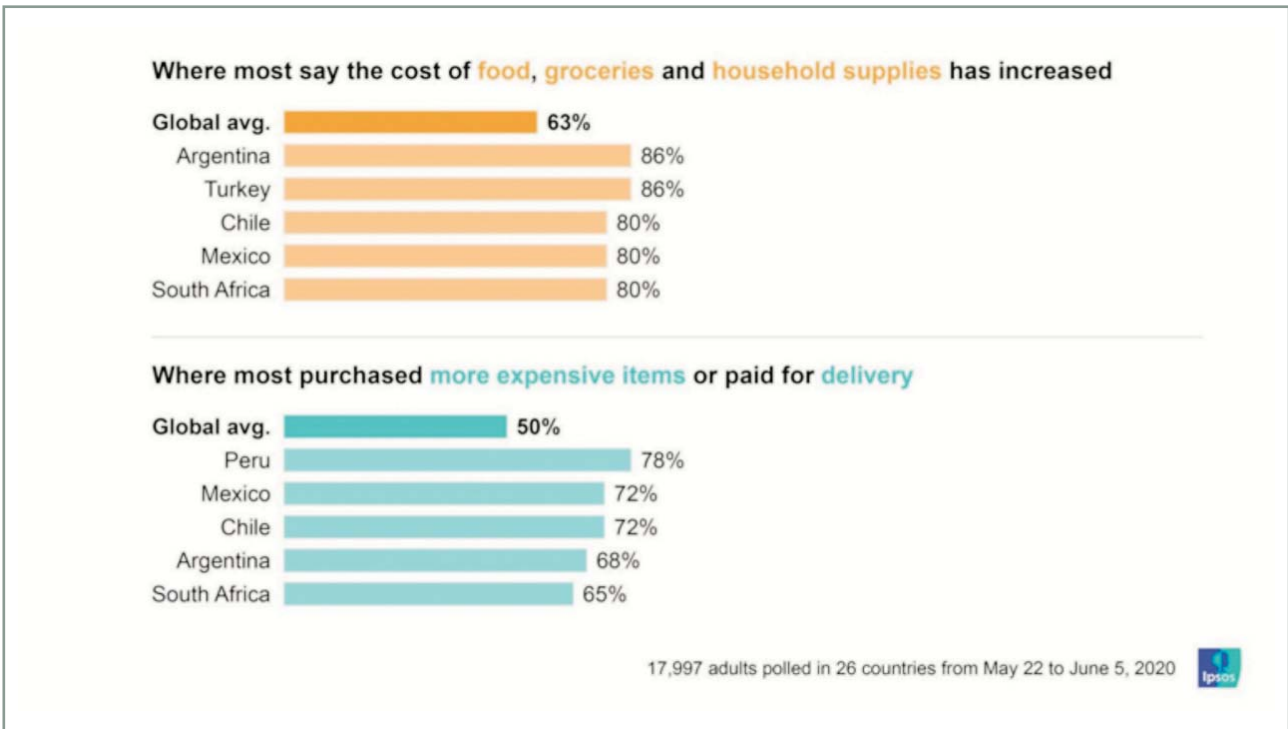
“TURKEY'S FOOD SECTOR AND COVID-19”



Turkey is a lucky country with its huge local production and protein sovereignty that enables feeding its citizens and continue selling abroad. So even during the initial phase of the COVID-19 pandemic related lockdowns, it did not face food shortages yet again failed to escape severely higher food price inflation. Only the pesticide price inflation was 90% in Turkey during 2020.

Turkey's lesson from COVID-19 was however that even though local production plays a particularly important part in securing food security and export income, it is better to combine such capacity with innovation to produce cheaper food and provide a cheaper alternative to imports. New technologies to boost output, local production of high value crops and livestock, changes in diets, smooth flow of global food trade all will play important roles in the future.

// Figure 34. Cost of Food Since COVID-19



Source: IPSOS

As Turkey implements measures to combat Covid-19, new challenges emerged for the food and agricultural sector. 2020 saw export restrictions from Black Sea regional trading partners namely Russia, weekend lockdowns including the closing of grocery stores, restaurant and bars in 2Q20, and fluctuating food prices throughout the year have all been issues to smooth out.

2020 trying to steer an emerging crisis. New measures, included a six months delay in farmers' government loans due in May and June totaling about 6 billion TL (approximately \$859 million), the establishment of a new online digital marketplace to connect producers with buyers, and the introduction of additional duty-free grain tenders with an aim to assist producers in an effort to ensure the food supply meets demand.

The government took many measures in

While Turkey has not given emergency support to Turkish producers in response to the Covid-19 pandemic except seed supports in certain regions of Turkey; it nevertheless took measures to manage the effects of COVID-19 on Turkey:

WEEKEND AND HOLIDAY MANDATORY QUARANTINE:

On April 10, weekend and holiday curfews that require everyone in the 31 most populous municipalities to stay inside were instructed. Grocery stores were closed and outdoor exercise was not allowed. Yet, bread bakeries, private and public health facilities, and pharmacies were open. Agricultural activities such as planting and irrigation required for continuing agriculture were kept exempt from curfew measures.

UNFAIR PRICE EVALUATION BOARD:

On April 16, Turkey's Parliament passed legislation to establish the Unfair Price Evaluation Board, which would regulate excessive price increases and stocking practices of manufacturers, suppliers, and retail businesses for commodities that are under pressure due to Covid-19-related demands. Violators received administrative fines.

TURKEY FACED EXPORT RESTRICTIONS FROM THE BLACK SEA:

Turkey implemented very limited export restrictions on only a few niche products such as lemons and ethyl alcohol. However, the country faced exports quotas and bans for several products from

Russia, the world's top exporter of wheat, which Turkey regularly imports wheat, grains, and oilseeds. On April 17, Russia implemented a 7 million ton quota on wheat exports, until farmers begin harvesting the new wheat crop in July. Turkey imported roughly 5 million metric tons of Russian wheat in 2018/19 and was estimated to import the same amount in 2019/20 before restrictions were announced.



SUNFLOWER SEED PRODUCTS:

On April 18, Turkey lowered the tariff for crude sunflower seed oil to 18% from 30% and the tariff on sunflower seeds to 9% from 13%; to be valid until June 1. The decision came as a response to the increased prices brought about by the Russian sunflower seed products export ban and a severe price hike in the Turkish sunflower oil products remain to date.

ELECTRONIC COPIES OF CERTIFICATES:

On April 2, the MinAF informed trading partners that electronic copies of certificates via email will temporarily be accepted for all plant-based shipments if the original certificate cannot accompany the shipment (as required by Turkish law) in order to facilitate trade during the pandemic. The original certificate is still required to be provided at a later date. On April 30, MinAF announced that the same rule will be valid for animal and animal products as well.

FOREIGN TRUCK DRIVERS:

Trade Ministry announced that foreign truck drivers making deliveries in Turkey will not be subject to 14-day quarantine provided they do not have any symptoms during the health checks at the borders and leave Turkey within 72 hours. Trucks delivering medicine, foodstuffs, and medical equipment were given priority to enter Turkey.

CITRUS FARM AND WHOLESALE PRICES AND DEMAND:

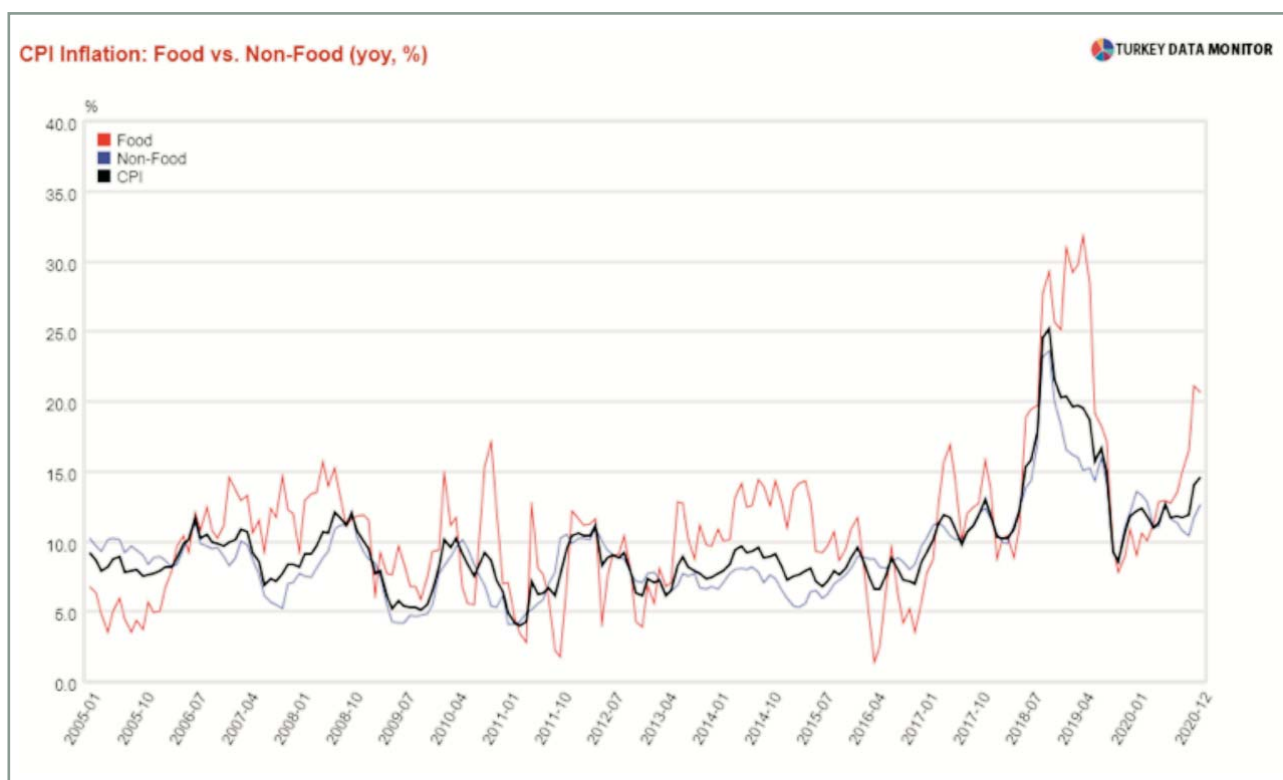
Lemon exports have been restricted until August 2020 to combat an increase in prices as a result of high demand from the domestic market. The decision followed a sharp drop in wholesale lemon prices. Separately, Istanbul Municipality launched a new project to support lemon

producers in the Mediterranean region, buying lemons directly from producers to donate to citizens of the municipality who need food support. Farm prices of oranges staged a severe spike in 2Q20 as demand for citrus has increased in Turkey due to its high Vitamin C content, thought to help boost the immune system.

FEED PRICES:

Feed prices jumped 10% in April when compared to the same month of the previous year and close to 40% in 2020. The rising costs stirred livestock producers who say they are not optimistic about sustaining current levels of livestock production as raw feed material supply is dependent on imports. Soy, corn, sunflowers, bran, pulps and many other important ingredients for mixed feed for animals are imported from other countries.

// Figure 35. Turkey Food and Non-Food Price Inflation (2005-2020)



Source: Turkstat, TDM



FRUITS AND VEGETABLE EXPORTS TO EUROPE:

The Turkish Vegetable and Fruit Exporters Union said the demand for fruit and vegetables from European countries, mostly Romania, Germany, Ukraine, Bulgaria and Russia, has increased 11% from March 20-April 20 compared with the previous year. The most in-demand products were tomatoes, peppers, apples, zucchini, and oranges.

TMO EXEMPTED FROM ADDITIONAL TAXES:

On April 18, Turkey announced that TMO was exempted from paying additional taxes like anti-dumping or countervailing duties on all imported grains.

ZERO DUTY FOR RICE EXTENDED:

On April 30, Turkey allowed the extension of the duty free import of up to 100,000 MT of paddy rice by the private sector, until June 30.

NEW TENDERS:

TMO has issued two new tenders to import specified quotas of grains duty-free in April: 175,000 MT of milling wheat on April 10 and 27.500 MT of milled rice on April 27.



NEW “DIGITAL AGRICULTURAL MARKET”:

On April 29, MinAF, in association with the Ministry of Trade, Ministry of Treasury and Finance, and TOBB established an on-line marketplace for farmers and agribusiness producers called DITAP (<https://ditap.gov.tr/>) to post available products and connect with buyers in order to support and supplement the traditional food value chain, especially during Covid-19. The goal of the exchange is to facilitate direct agricultural sales to lower food prices in Turkey and help the producers to have more value added. Eventually, the private sector will be running the platform. During the initial phase, the goal is that 10% of fruit and vegetable trade will occur through the digital market, with animal products being added during the second phase.

“

**TURKEY RETAIL FOOD AND
BEVERAGE SECTOR: NEW
TRENDS AFTER THE PANDEMIC
WITH THE ONLINE SALES
BOOMING**”



Turkey has 48,949 food processing and 627 beverage producing enterprises representing 14% of all manufacturing activities, according to the most recent statistics published by Turkstat for 2018. With a modern and developed food processing industry, the country is able to supply food products for the domestic population, the inflow of tourists and also export with a global market share close to 1.5%.

Turkey's well-developed food processing sector is producing good quality food items for the Turkish market and to export overseas. In addition to local production, products from European countries are also significant. The EU has a customs union with Turkey where many European processed food items have low or no customs tariffs to Turkey. Furthermore, proximity is a major benefit for lower freight and shorter delivery times from Europe. Switzerland, Norway, Iceland, and Liechtenstein that make up the European Free Trade Association (EFTA) countries also have joint FTAs with Turkey, giving preferential customs advantages as well. In addition, Turkey has FTAs with 19 other countries with many including preferential tariff rates on food and agriculture products including the United Kingdom sealed right after the Brexit.

As Turkey's food sector has become more specialized and export oriented, Turkey's food imports are mostly consumer-oriented agricultural commodities such as rice, dried beans, walnuts, almonds, bananas, coffee, cocoa, meat, fish and different kinds of processed/packaged food items.

// Figure 36. Sales of Food Retailers by Channel (USD mn - 2018)

| | |
|--------------------------------------|---------------|
| Modern Grocery Retailers | 36.436 |
| Convenience Stores | 1.330 |
| Discounters | 13.167 |
| Gas Station /Forecourt Retailers | 584 |
| Hypermarkets | 941 |
| Supermarkets | 20.415 |
| Traditional Grocery Retailers | 32.523 |
| TOTAL GROCERY RETAILERS | 68.959 |

Source: Turkstat, Ministry of Industry and Technology,

As of 2019, Turkey's grocery sales were USD \$69 billion making up about 55% of Turkey's total retail industry sales through circa 348K chain and independent grocery retailers. The official inflation/seasonally adjusted “Real Retail Sales Index” announced by Turkstat show stable increases during 2015 and 2018; yet the Index started to decline in 2019 following the August 2018 currency crisis in Turkey. On the other hand, Turkey's food retail industry has been growing despite the past two years of domestic political and global economic challenges with a focus on the hard discount segment.

Grocery retailers can be classified in two major groups in Turkey: organized/modern grocery retailers and traditional grocery retailers. Organized grocery retailers are retail chains, discount grocery chains, regional grocery chains and gas station convenience stores.

Organized/modern retailers have been enjoying a rising portion of the grocery market over the past decade and as of 2017 they make up the majority of the grocery market share as traditional retailers are slowly exiting the market.

Turkey's first declared COVID-19 case was recorded on March 11th, 2020.

During the initial lockdown measures that lasted starting from April to June 2020 grocery stores remained open and operational while the government closed down shopping malls, restaurants and cafés along with many other stores and outlets.

The pandemic skyrocketed online sales of major supermarket chains and smaller food and beverage retailers in major cities across Turkey starting with Istanbul, Izmir, Bursa, Ankara and Antalya. Even the hard discounter stores started online ordering services during the pandemic and local food producers also heavily engaged in online and farm-to-door sales. This trend is expected to continue in the years ahead.

With Turkey's vast food production detailed in the earlier sections, no shortage of goods was observed in the markets during the pandemic- Turkey's one major differentiating factor compared to many other developed and emerging economies.

In fact just the opposite happened and major grocery chains that saw record food and beverages sales turnovers due to the pandemic, especially before the mandatory weekend lockdowns in major cities in Turkey. Sales of pasta, grains such as rice, chickpeas, dry beans etc. has been boosted as people began storing basic food staples at home. Even though bakeries never shut down in Turkey during the curfews retail sales of yeast and flour have amplified due to increased baking at home during the pandemic.

The pandemic along with TL depreciation however carried the food price inflation to significantly high levels affecting Turkey's young population negatively.

Food price inflation has become a structural economic problem over the past five years; especially after the August 2018 currency crisis.

Market analysis show while food price inflation is hurting the most vulnerable, the rising online food shopping and rising home-cooking will boost the sales of standalone gourmet/premium food stores located in major city centers like Istanbul, Izmir, Ankara, Bodrum, Antalya, Bursa, Cesme. **Demand for higher-value processed food products, specialty meat products or high value food items generally will increase in the medium to long term in Turkey's urban western centers where consumers are relatively wealthier.**

With a growing middle class who travels more than their parents, taste for international flavors have been on the increase and the trend will continue beyond COVID-19. Given the permanent rise in online/at home working, Turkish customers increasingly prefer to shop in regions where their homes are located or they prefer healthy, locally produced food items for which they can track the production process. Hence, farm-to-door or online sales through food retailing platforms that have emerged in the past couple of years have also been a rising trend.

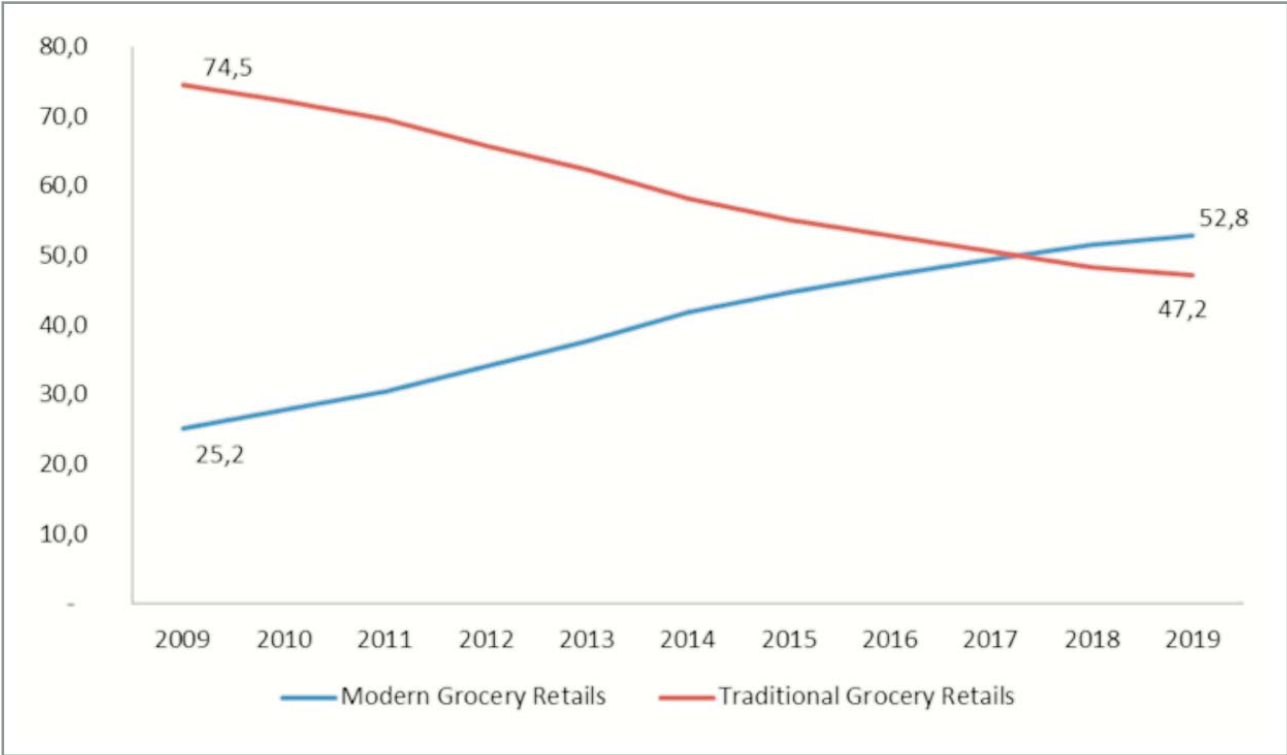
For the remaining vulnerable masses, the already high price sensitivity will escalate. With the deteriorating purchasing power and

increasing unemployment and not with all reasons based on the COVID-19 shock, prices have become more important than ever to Turkish consumers. Therefore, discount retailers have been rapidly increasing as of 2019 and 2020.

Especially since after the August 2018 currency crisis, consumers have started to prefer hard discounters or discounters offering private label products, which are on average 30% cheaper than the original

brand. Discount grocery retailers led by BIM and A101 are the market leaders with their strategy of opening up compact 100 to 400 square meters stores everywhere in neighborhoods and side streets. Their strategy is leading the closure of “bakkals” (traditional stand-alone small grocery shops) at an increasing scale. In an effort to compete, grocery supermarket retailers such as Migros and CarrefourSA are opening smaller convenience stores like M-Jet and CarrefourSA Express to serve the price sensitive segments.

// Figure 37. Market Shares of Traditional vs Modern Grocery Retails (2009 - 2019)



Source: Turkstat, Ministry of Industry and Technology

In smaller towns and villages across Turkey, the presence of modern grocery retailers is still slow. Traditional small grocery shops are still the main way of grocery shopping in those places. The traditional local grocery retailers are mostly standalone grocery stores which are called “bakkal” in Turkish which are small in terms of square feet selling high-turnover

grocery products. The other major channel in the traditional market structure is open-air bazaars/markets (pazar in Turkish) where fresh produce, nuts, fish, and even some textiles are sold by producers and traders. These are weekly farmers markets and are held on streets in different neighborhoods.

Even though the market share of the modern organized grocery retailers has surpassed the share of traditional grocery retailers and increasing; the trend of traditional groceries losing market presence will take more than a decade in Turkey.

The consumers have become more price sensitive in the past two years amid economic troubles in Turkey and there is a rising competition from increasing penetration of the discounters versus the non-discount grocery retailers. The successful discounter model operated by BIM, A101 and Sok grocery retail chains reflected by higher market shares, is based on consumer proximity and of course lower prices. Hence with the food retail market turning more and more price sensitive when profit margins are low, the international players have been leaving or siding with local partners over the past decade. It appears that the domestic grocery store chains will continue to dominate the Turkish market at least for the near to medium term. Beyond price sensitivity, for foreign grocery retailers it has been hard to understand and manage the Turkish market and consumer. During 2012 and 2017, Tesco (UK), Real (Germany), and Dia (Spain) have left Turkey, while Carrefour sold the majority of its shares to its local partner Sabanci Holding. Further consolidations might be expected in terms of national chain markets to buy local chain markets.

Online grocery retailing to boom in the next five years

Online grocery retailing, with Migros as the market leader, has been rising before COVID-19 in Turkey. Euromonitor International forecasts approximately 21% real growth per year between 2019 and 2024 for food and beverage e-commerce in Turkey. No doubt the COVID-19 of 2020 has given all online grocery retailers a major boost in Turkey; just like in the world

and even the 21% real growth forecast could be exceeded.

Yet, online grocery retailing is active only in major cities.

The unique model of home-based retail shopping via smart phone app called "Getir" in Istanbul has seen a boom during 2020. It has no retail outlets, but distributes high-turnover products, both food and non-food to homes in an average of 10 minutes on 24/7 basis. The business model innovation is a huge success and is likely to extend to a few more major cities beyond Istanbul.

As of 2019, another company called "IsteGelsin" was also operational with a business model very similar to Getir. The pandemic-related obligatory or voluntary lockdowns boosted the company's sales.

Some "farm-to-door food producers"- especially for meat, milk and their products are also delivering groceries through online sales to a select and dedicated number of wealthy customers in Turkey's big cities. Deliveries are mostly based on certain days of the week for each city.

Several major online marketplaces chose to partner with modern grocery chains or local food producers to be able to deliver groceries in late 2019. Trendyol which was sold to Chinese Alibaba in 2018, was known as an online portal selling fast-fashion items dominantly, has partnered with Migros, Gittigidiyor (owned by eBay) and with Carrefour to sell grocery items in 2019. Whether the model has worked successfully is to be seen.

Turkey is a highly competitive and very price sensitive market for many items, with majority produced locally.

Prospective investors into Turkey's food and beverage sector should be persistent and consider Turkey as a long-term market opportunity.



**“ BREXIT AND
TURKEY'S FOOD AND
RETAIL SECTOR ”**





A free trade deal (FTA) signed between Turkey and the United Kingdom on the last days of 2020, immediately after the U.K. and the European Union compromised on a trade and cooperation agreement to avoid a no-deal Brexit. The U.K.-Turkey FTA takes as its model the arrangements in the EU-Turkey Customs Union and preferential EU agreements with Turkey on coal, steel and agriculture. By bringing together the provisions of a number of distinct EU-Turkey arrangements into one modernized FTA, a simpler instrument was created.

The agreement is very important for preserving the trade flows between the two countries as trade has grown 70% percent over the last decade, and in 2019 before the COVID-19 restrictions, reached nearly 19 billion pounds. Through the

FTA, U.K. and Turkey aims to escalate volume of trade to 21 billion pounds within the next three to four years.

The U.K. has a share of 6.7% in Turkey's total exports and ranks as Turkey's 5th largest export market. It roughly account to 3% of Turkey's annual food and beverage exports.

The UK's agricultural sector can provide food for almost two thirds of the country's 66.6 million population, including fishing. Hence, currently the EU provides 70% of food exports to the UK. The Brexit deal among the EU and the UK is tailored at the 25th hour, yet the impact on food price inflation is expected to be genitive for the Britons.

Fresh and dried fruit, as well as nuts, frozen and canned fruit and vegetables are exported from Turkey to the UK. 15% of Britain's imported fresh and dried grapes come from Turkey. 2.5% of fresh and dried citrus fruit is also imported from Turkey. The demand for Turkey's organic produce in the country is also increasing. Turkey currently provides less than 1% of food imports to the UK. But there is potential to increase this.

Turkey's newly signed FTA with the U.K. targets lowering high tariffs in the medium term through improvements to the deal which are currently hindering fruit and vegetable exports. As the Brexit deal's impact on the Britain's rising food price inflation will be seen only in time, Turkey stands ready to quickly take advantage of the break in relations to renegotiate better tariffs for its exports.



WHAT THE
FUTURE
HOLDS?

2 PART

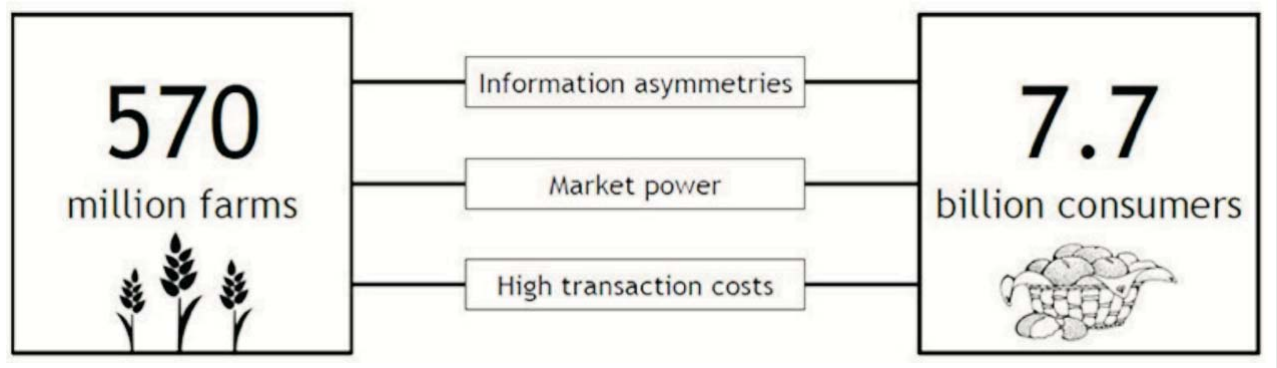
“ COVID-19-CLIMATE CHANGE- TECHNOLOGY ”



The world's population at 7.7 billion people and counting, participate in the food system every day. We decide what food we consume, what clothes we wear and what products we use; much of which originate in agriculture. Agricultural goods are produced on 570 million farms around the globe, most of them small, run by families, and mostly located in developing countries.

The food and agriculture sector extends beyond agricultural production to include storage, processing, distribution, transport, logistics, retailing and other services. Hence, food systems are both local making them an essential feature in communities; and also global, linked through trade, financial and insurance markets.

Agriculture contributes 26% of greenhouse gas emissions, consumes 70% of fresh water, and has caused the loss of 60% of vertebrate biodiversity since the 1970s. The cost of these negative side effects amounts to USD 12 trillion according to the FAO, outweighing a market value of USD 10 trillion. The planetary food system can be imagined as an overloaded boat becoming increasingly volatile with each additional burden: population growth, climate change, loss of biodiversity, pollution, land degradation and now the pandemic. Hence the future depends on setting a new course for the food system that reduces hunger, creates healthy people and a healthy planet simultaneously



COVID-19 printed unprecedented scenes to our minds: supermarket shelves stripped by panic buying, livestock wasted because processing plants were closed, ghost like streets, hotels, restaurants, bars in mega cities as consumers limited with the quarantine measures were battling to get deliveries. Suddenly concepts like “food security, self-sufficiency, and better farming practices” became household words. More people began thinking about where their food comes from, how easily it can be disrupted. And exploded a rapid shift to home cooking.

To reduce disruptions, the governments engaged in intensified efforts to reconsider

how better to feed their citizens. Just as Covid-19 hit some of the most vulnerable populations around the world, climate change has created an unstable food supply across these same regions for years to come.

COVID-19 has exposed the vulnerabilities of global food production and supply chains, and it has the power to drive some important changes in the agribusiness space. It highlighted the risks of unhealthy diets and the extreme fragility of the global food system. The pandemic has underscored the urgent need to transform agriculture. The COVID-19 pandemic thus has urged the governments to rethink and redefine

how they feed their citizens. The devastation created with COVID-19 hence presents a unique opportunity to adopt long-term measures to promote healthier diets, encourage farmers to produce a wider range of food stuff, and strengthen collaboration among the public-health, food, and agriculture sectors. And the economic reconstruction that will follow it represents a perfect opportunity to reallocate resources and refocus.

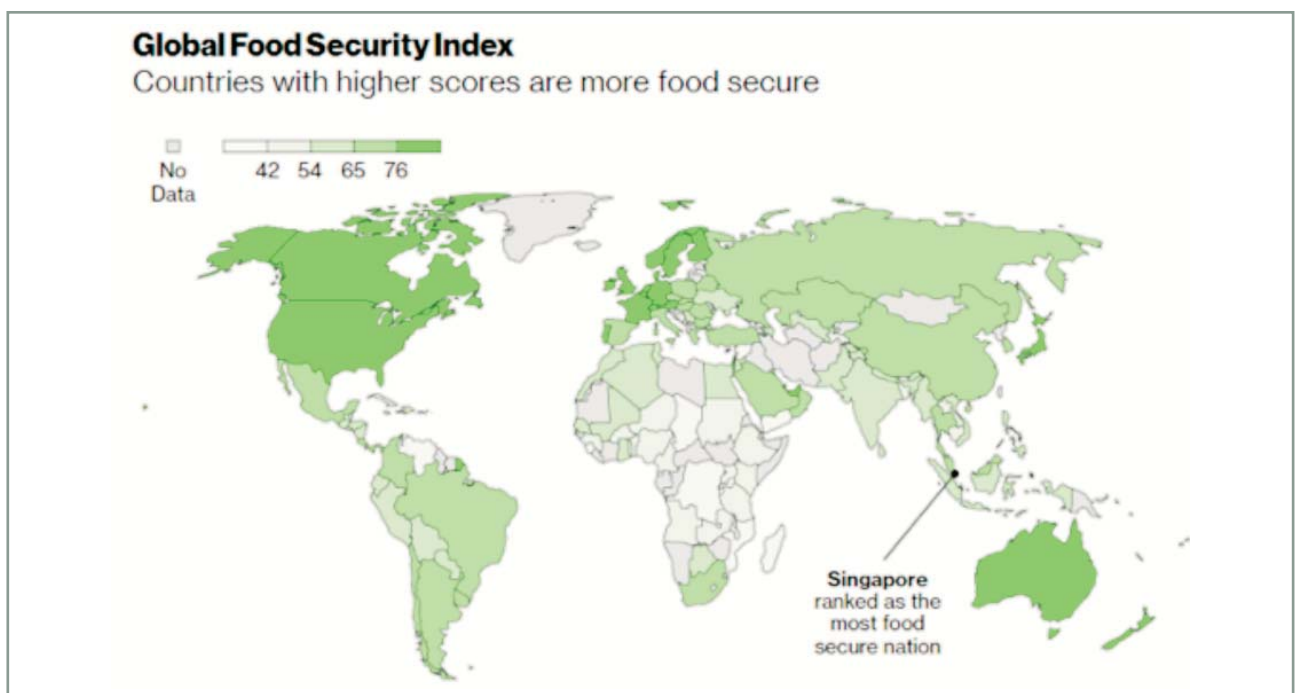
Agricultural research can play a vital role in transforming food systems, making them more sustainable and resilient. Agriculture uses large amounts of freshwater, accounts for 26% of global greenhouse-gas emissions, and destroys natural habitats to make room for livestock and crops. And yet agricultural research has long focused on boosting productivity rather than sustainability. Governments have encouraged this trend with financial support, regulatory standards, and trade agreements.

From COVID-19 and on research will also have to focus on to food products that

could “sustain a more diverse and healthier diet”. Policymakers should foster regenerative production systems that promote biodiversity and improve soil and water quality, which would contribute significantly to climate-change adaptation. Governments, international organizations, and NGOs must take the lead in shaping an institutional environment that enables these far-reaching changes in the agricultural research agenda.

The world grows enough food to feed well over 9 billion people, yet one third of it is wasted through pests, harvesting, processing, storage, and transportation, or by simply throwing away uneaten dinners. Hence “sustainability” will be at the heart of the future of agribusiness on a global scale because food production is the main driver of environmental degradation and biodiversity loss while 30% food loss from farm to table also needs to be tackled. The virus could give a boost to automation, local-origin products, reduction in food waste, rise of alternative proteins and building better distribution channels.

// Figure 38. Global Food Security



Source: The Economist Intelligence Unit

Local production, on the other hand, is not the answer for many types of food. Roughly 17% of the world's population relies almost entirely on international trade for food according to WTO. Hence food security necessitates building strategies beyond local production yet along with efforts to boost local production.

As COVID-19 rattled the earth in 2020, for some time there has been a bigger driver shaping the future: **By 2050, the global population will be pushing 10 billion people, each of whom will eat on average 12% more than they did in 2000, including about twice as much meat and poultry, according to estimates from the FAO.** More than two-thirds of the world's population is forecast to live in cities by 2050, according to the UN. That would mean food consumption rising by 70% in the first half of this century that we all live in. This translates to the fact that avoiding food crises is a matter of political resolve and technological advancement alone simply will not fix it. More effective and responsible production practices are needed. Post-COVID-19, more resilient regional food systems are needed to be built including low carbon solutions.

There are three main forces driving the current changes to the way we consume food today:

1. Climate change,
2. Changes in diet and consumer behavior,
3. Technology advancements.

Hence, global food systems must meet a formidable “triple challenge” simultaneously:

1. Provide food security and nutrition to a growing global population that will reach almost 10 billion in 2050 according to the FAO,
2. Contribute to the livelihoods of people around the world working along the food supply chain,
3. Ensure the environmental sustainability of the sector, while adapting to, and helping to mitigate climate change.

E1 // **CLIMATE CHANGE AND THE FOOD SECTOR**

Climate change places the food sector under increasing pressure. **The UN cautions about a looming food crisis where the challenges facing agriculture and food systems are so stark that to continue with “business as usual” is not an option.**

If, as estimated by the FAO, food demand increases by over 50% between 2020 and 2050, food systems will have to undergo significant changes because the current methods are not sustainable; given that resources are already over-stretched and arable land is becoming scarce.

Such confluence of factors is driving the change. Yet in shaping a different future, seven major challenges facing the agriculture industry and food production should be considered:

1. Environmental factors, such as greenhouse gas (GHG) emissions and scarcity of water. The main GHGs that trap heat within the atmosphere causing climate change are water vapor, CO₂, methane, ozone, nitrous oxide and chlorofluorocarbons. In fact, the most important GHG emissions from animal agriculture are methane and nitrous oxide. Methane, or CH₄, mainly produced by enteric fermentation and manure, is a gas which influences global warming 28 times more powerful than that of carbon dioxide. Nitrous oxide, arising from manure and the use of fertilizers, has a global warming potential that is 265 times higher than that of carbon dioxide. 70% of freshwater withdrawals globally are consumed by agriculture (only 10% domestic, 20% industrial) and it is livestock farming rather than the growing of grains, fruits and vegetables that consumes by far the most water per unit produced.

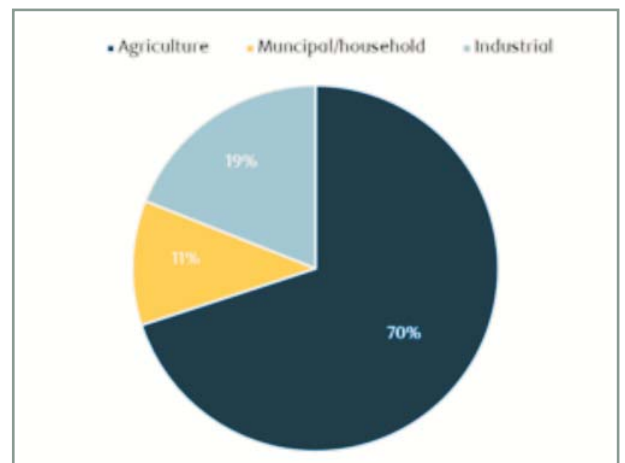
It is clear that today's increased agricultural activity is a threat to environmental sustainability. Continuing with the current trajectory, the environmental impact from food production will increase from 50% in 2010 to 90% in 2050. If we continue with our food system as it is, we will surpass all possible planetary boundaries in 2050. Greenhouse gas emissions will increase from 80% in 2019 to 92% in 2050, crop land use up to 67%, freshwater use to 65%, and phosphorus and nitrogen applications to around 50%.

// Figure 39: Food accounts for 26% of global GHG emissions



Source: Poore & Nemecek (2018), Science, BBC, BofA Global Research, April, 2020.

// Figure 40: Global water withdrawals by use



Source: UN FAO

2. Health concerns, such as pandemics like Swine flu or COVID-19, and the growing resistance to antibiotics in humans. The EAT-Lancet report reveals that our food system is a key driver behind health problems. Unhealthy diets pose a greater risk to morbidity and mortality than unsafe sex and alcohol, drug, and tobacco use combined. The system is also highly unequal. Globally more than 820 million people remain undernourished, while almost half the world's population will be overweight or obese by 2030. A steep increase in diet-related diseases such as

type-2 diabetes and coronary heart disease is being observed. These results not only reduced quality of life for those affected, but also puts a large burden on economies due to rising healthcare costs and lost productivity. Consumers are increasingly demanding sustainably sourced and healthy products. The COVID-19 pandemic has demonstrated and increased the urgency of taking care of our health while having a strong immune system has never been more critical. Consumers also now have a deeper understanding about the relationship between what we eat, how it has been produced, our health and our environment, and are demanding that companies live up to their promises.

3. Scarcity of land: Raising output by putting processing more land is becoming increasingly contentious because of deforestation and habitat loss. A better alternative may be to reclaim fields that have been lost to desertification or misuse. At least a third of the world's arable land has been degraded to some extent because of poor management, urbanization, or climate change, affecting the lives of 2 billion people, according to the FAO. UN scientists estimate some 900 million hectares could be restored by adopting existing techniques such as the sustainable use of fertilizer and irrigation.

4. Food security and the negative impact of globalization: Food security prevails if both food supply and demand are sufficient to cover food requirements on a continuous and stable basis. For enhanced food security, food needs to be available, accessible and affordable in a sustainable manner. Globalization has allowed agricultural production to grow much faster than in the past. A few decades ago fast growth was somewhat

over 3% per year; now it is 4.0-6.0%. However, these higher rates of growth involve a substantial change in its composition. The bulk of growth initially came from basic food staples when the scope for export markets is limited, whereas there is now a swing towards much higher value commodities. Pandemics of the future will threaten food trade while climate change would alter the production areas.

5. The already huge - and growing - demand from EM that cannot be met. In developed markets meat demand has peaked, in part driven by trends like vegetarianism and veganism as people become more health and climate conscious. Yet, meat demand from EM will sustain growth in the global meat industry. According UN FAO and the OECD, global beef consumption will increase by 8% in the period between 2018 and 2027, but growth in EM is expected to be nearly triple that number, at 21%, and most of this growth will come from China.

6. Food waste: One third of all food produced globally goes to waste. Substantially reducing food losses at the production side and food waste at the consumption side is essential for the global food system to stay within a safe operating space. Both technological solutions applied along the food supply chain and implementation of public policies are required in order to achieve an overall 50% reduction in global food loss and waste as per the targets of the SDGs. Actions include improving post-harvest infrastructure, food transport, processing and packing, increasing collaboration along the supply chain, training and equipping producers, and educating consumers.

7. Consumer demand and concerns.

Consumers not only want to eat more healthily but are also concerned about the planet - the conscious consumer. Consumer demand for different food products has changed in important ways in OECD countries over the last thirty years driven by increasing per capita incomes, demographic shifts, and lifestyle changes. At the same time there have been significant structural changes in the food production and processing sectors. These changes have been driven by consumer demands but also by concentration and competition in the international food market, farm policy and programmes, technological innovations, and public policy and private attitudes related to food safety, nutritional labelling, environmental concerns and other food-related issues.

The biggest trend driving change in the food and beverage industry right now is “**transparency**”. Consumers want to know and understand what ingredients are going into their products. “**Health and Wellness**” is a trend that has been the fundamental driver of change in food and beverages worldwide over the past decade, and this trend will not only continue, but also accelerate. “**Plant-based, non-dairy alternatives**” are driving the big change. Plant-based is a long-term format shift that is gravitational and dramatically changes the choices that consumers make. Being “plant-based” does not necessarily require the consumer to be vegan or vegetarian, rather reflects a preference that approximately 70% percent of the meals to contain plant-based, 100% clean ingredients.

E2 // TECHNOLOGY - DIGITALIZATION AND FOOD

Some of the most dramatic changes to the 12,000-year-old agriculture industry are being tested by technology startups around the world that are coming up with better ways to grow, water, fertilize and harvest crops, and feed and rear animals - or replace them.

Advances in genetics, nanotechnology, automation, robotics and artificial intelligence and other emerging technologies are accelerating. Hyperconnectivity, the internet of things, augmented reality and collective intelligence systems, combined with reduced costs of implementing new technologies, are transforming entire systems of production, management and governance of the food sector.

Digital technology drives change on multiple fronts at accelerated rates by collecting, using, and analyzing massive amounts of machine-readable data about practically every aspect of the food system at nearly zero marginal cost. In fact, venture capital investors poured USD 2.8 billion into agtech startups across the globe in 2019.

Digitalization will ease companies to combine product features such as ingredients, packaging, and cost to fulfill the needs of a particular consumer segment. But for digital innovation to yield positive outcomes, public policy must

boost complementary infrastructure and human capacity, seeking to de-concentrate markets and supply chains, decentralize traceability, and disseminate data.

Digital platforms can help de-concentrate and increase the number of markets up

and down the food system leading to better outcomes at either end of the supply chain. In the wake of the pandemic, many producers have fast-tracked the move to digital platforms to connect producers and consumers baffled by physical lockdowns.

// Figure 41. Innovation Areas

| Category | Innovation |
|----------------------------------|---|
| Autonomous Farming | Autonomous tractors automate land and crops cultivation |
| | Autonomous pickers enable tailored harvesting of crops |
| | Robotic weed / pest killers control weed and pests with high precision |
| | Robotic fertilisers optimise quantity and timing of fertiliser application |
| Intelligent Farming | Micro-sensors provide specific and detailed information on land, crops and livestock |
| | Robotic soil samplers give insight in the soil condition |
| | Aerial crop imaging (drone, plane, satellite) informs farmers on the conditions of land and crops |
| | Big data analytics enables data-driven decision making on farming practices |
| | Farm management systems simplify and optimise farm management |
| | Data sharing collectives enhance collaborative learning |
| | Automated livestock behavior and health monitoring optimise animal welfare |
| Circular Farming | Feed additives reduce methane excreted by cattle |
| | Methane digestors convert methane from cattle into renewable gas |
| Artificial Conditions | Vertical farms allow for more resource efficient farming |
| | Optimal growing wavelengths improve crop performance |
| | Climate replication creates optimal growing conditions |
| | Fish farms (saltwater, zero waste) cultivate fish in a sustainable way |
| Alternative Proteins | Protein powder (e.g. insect flour) provides an alternative to animal protein |
| | Plant-based food provides an alternative to animal protein |
| | Cultured meats provide an alternative to animal protein production |
| | Fermentation provides an alternative to animal protein |
| | Microalgae provide an alternative to animal protein |
| Genome-Based Enhancements | Genomic selection generates more resistant and high-yield crops |
| | Genetic modification creates optimal seeds for all conditions |
| | Livestock disease immunity protects cattle against diseases |

Source: Deloitte, Future of Food 2020

Like previous zoonotic diseases such as HIV/AIDS and West Nile Virus, COVID-19 has brought to the fore the strong linkages between animal health, human health and planetary health, and the important role that human activities play by putting people in closer contact with wildlife. Poor management of livestock, unsafe food handling, ecosystem degradation and encroachments on wildlife habitats are responsible for a growing number of ills and illnesses. Digitalization has a major role to play here through tracing food throughout the supply chain in a decentralized manner that creates opportunities for safer, more sustainable food. De-centralization of traceability throughout the supply chain will improve incentives for safe, high quality, and socially and environmentally responsible food production and consumption.

Breakthrough digital technologies have the potential to deliver significant positive impacts for producers, consumers, and the environment, across food value chains. However, they are not a cure-all. Unleashing the promise of digital to improve food system outcomes will require careful policy-making and complementary investments.

E3 // CHANGES IN DIET AND CONSUMER BEHAVIOR: WHAT COVID-19 CHANGED

COVID-19 has changed the way people think about, purchase, plan and consume their food. The silver lining during this pandemic has been the rise of various positive trends, particularly around sustainability and health. Lockdown measures may have caused lasting behavior change in relation to food consumption, marked by substantial shifts in shopping patterns, meal preparation and eating habits.

In a survey carried out by EIT, consumers across Europe suffered financial hardship during the COVID-19 pandemic. Despite this, European consumers reported buying more in almost every food category, as COVID-19 lockdowns and a rise in homeworking across Europe led to people spending more time at home and eating out less.

The largest behavioral shift was the way consumers shopped, with nearly half reporting an increase in online shopping (45%); bulk purchases (47%); and carefully planned shopping trips (45%). European consumers are also spending more time in the kitchen with over a third (36%) reporting that they have enjoyed spending time cooking during lockdown. Sharing this experience with others became more important too, with three in ten (29%) sitting down to eat together as a household more regularly.

The survey also reveals that the increased significance that food has played in our lives will continue as nearly a third of consumers said it will be more important to have time to cook home-made meals (27%) and to continue eating more varied foods (30%) after the pandemic. In addition to prioritizing their own health, over a third (35%) said that buying locally produced food has become more important to them during the COVID-19

pandemic. And it seems the trend for shopping locally is set to continue, with almost nine in ten (87%) reporting that they were highly likely to continue doing so in the future.

Notable upward trends for the future include:

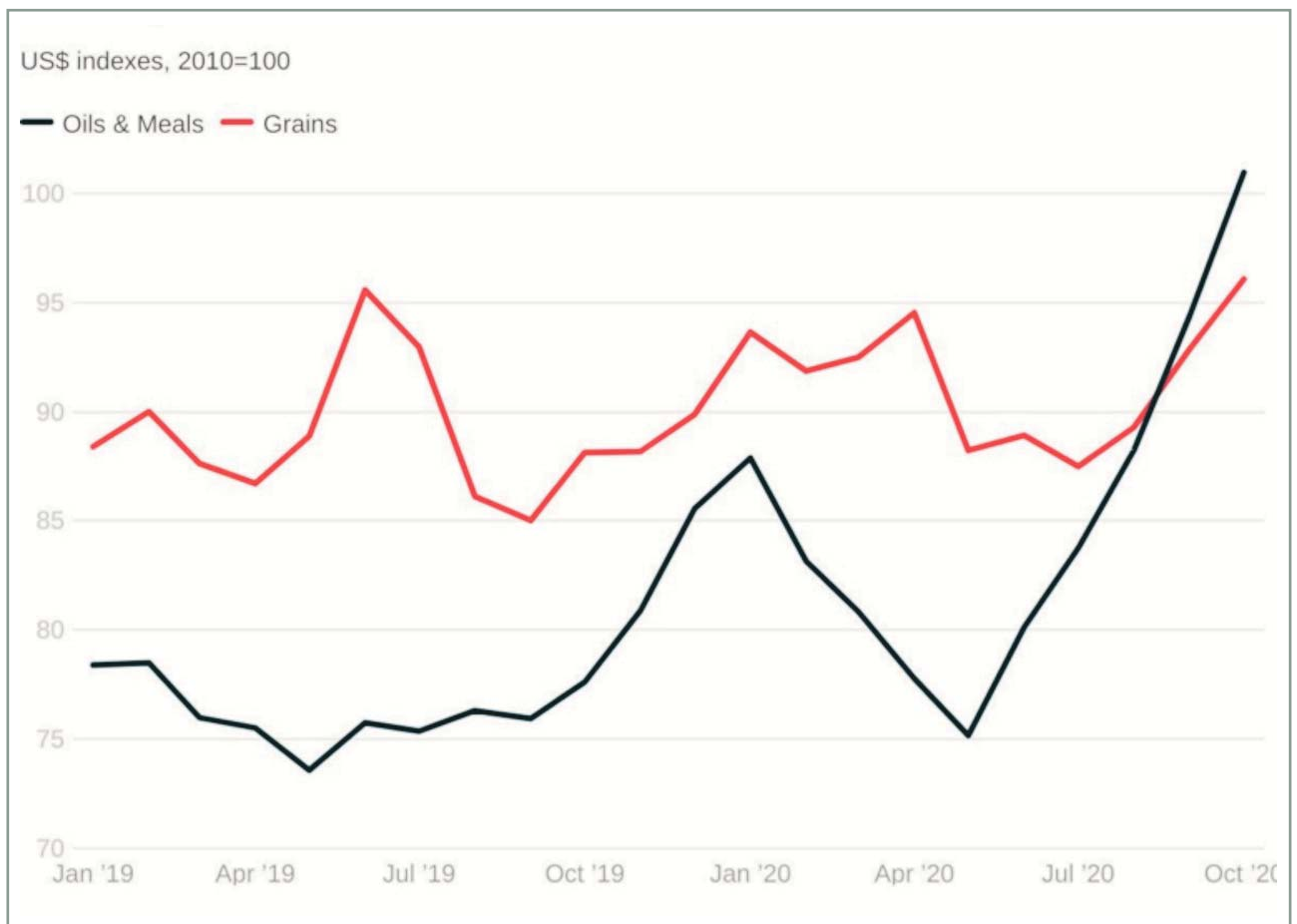
- Enjoying food and having a wide variety will matter more post-pandemic.
- Cooking skills and equipment and having time to cook will be more important.
- Accessible food stores and access to food at affordable prices are increased priorities.
- Nutritional knowledge, healthy foods and using food to control weight will matter more.
- People plan to buy more local food and reduce food waste.
- Since the COVID-19 pandemic, people have been paying more attention to how their food is packaged and to the information on the packaging, concerned with hygiene, freshness, additives and sustainability.
- Most pronounced overall is an increased focus on food affordability and value and with this comes the risk of widening inequalities and behavior gaps around healthy and sustainable eating.

The changes in consumers' food demand, globalization of agriculture and climate changes all lead to food price inflation. There has always been cycles in food prices yet the general trend has been on the upwards for the last three decades. Now with COVID-19 this trend seems to be accelerated restraining production in short.

Most food commodity prices have gained gaining momentum as end-2020 approaches, driven by supply shortfalls

and stronger-than-expected demand in some oils and meals as well as depreciation of the U.S. dollar. Following a projected increase of more than 3% in 2020, the WB's Food Price Index is expected to gain an additional 1.5% in 2021, according to the October 2020 edition of WB's Commodity Markets Outlook. Risks to the forecasts emanate from the path of energy costs, emerging La Niña conditions, macroeconomic uncertainties and regional conflicts.

// Figure 42. WB Food Price Indices (2019-2020)

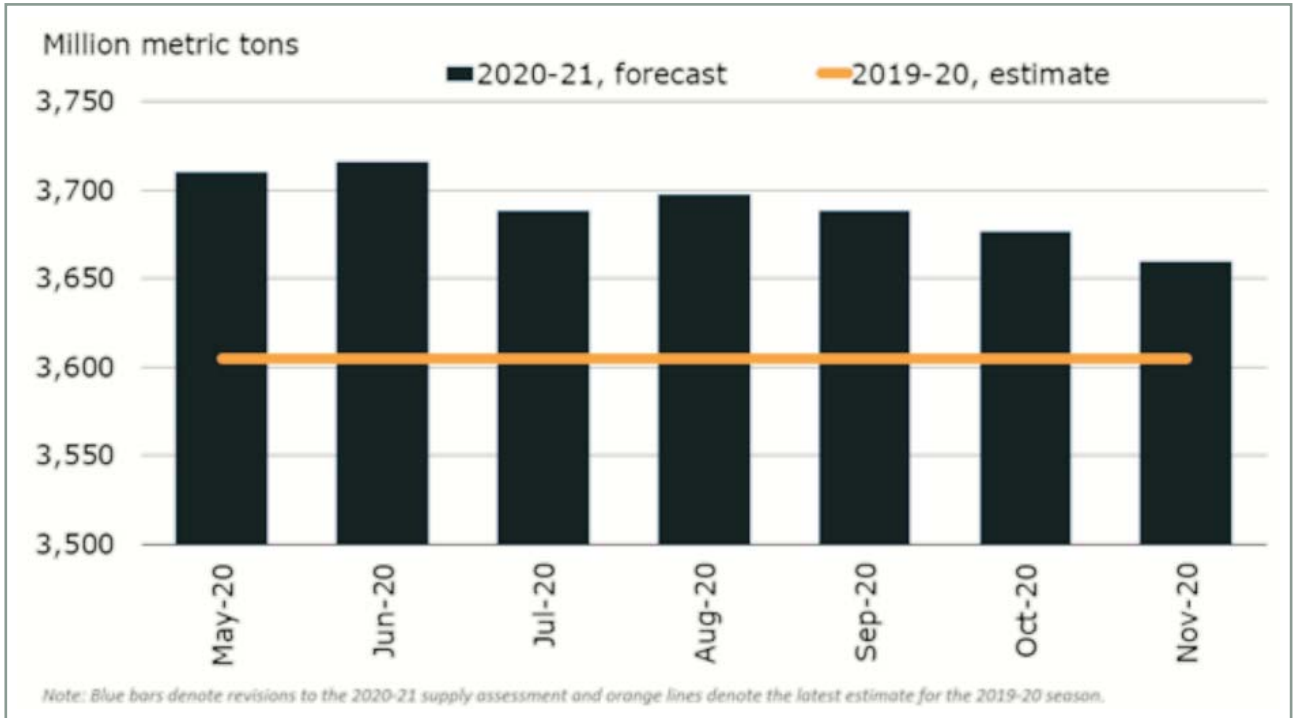


Source: World Bank

Early assessments for the current crop year suggested that supplies (beginning stocks plus production) of the three grains and soybeans, which together provide nearly two-thirds of the world's calorific requirements, would be 3% higher than

in 2019-20. Consistent downward revisions, however, has brought this growth down to 1.4% in November 2020 which is the latest assessment. This is marginally lower than the 3-decade average growth of 2.2%. Hence, food price pressures will continue in 2021.

// Figure 43. Grains and soybean supplies

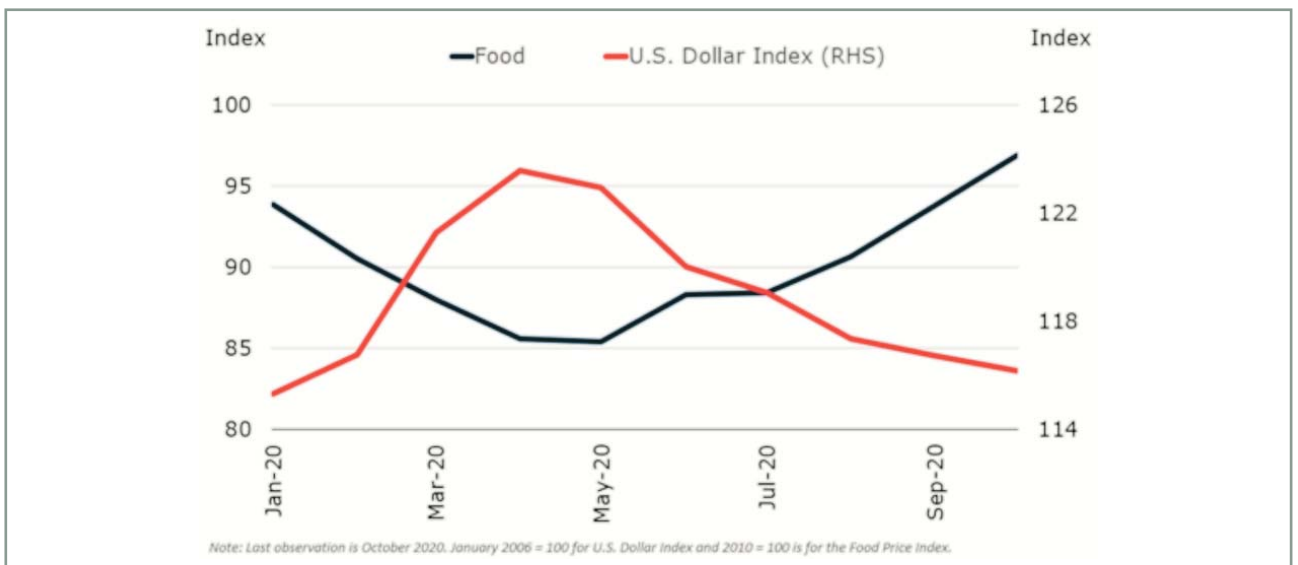


Source: US Department of Agriculture (USDA), World Bank

The weakening of the U.S. dollar plays a role in the recent uptick in food prices. From April to October 2020, the WB's Food Price Index increased 13%. During this period the U.S. dollar (measured against a broad basket of currencies) depreciated 6%. Research has shown

that the elasticity of agricultural commodities prices with respect the U.S. dollar is close to unity meaning that nearly half of the food price index uptick since May 2020 may be due to U.S. dollar movements and not the COVID-19's direct impact.

// Figure 44. Grains and soybean supplies



Source: Federal Reserve Bank of St. Louis, World Bank

Although food prices have been rising notably since May 2020 following earlier declines in 2020, the recent volatility has been modest and within the norms of the

past 6 years overall which can be characterized by relative price stability especially when compared to early in the decade.

// Figure 45. WB Food Price Indices (2019-2020)



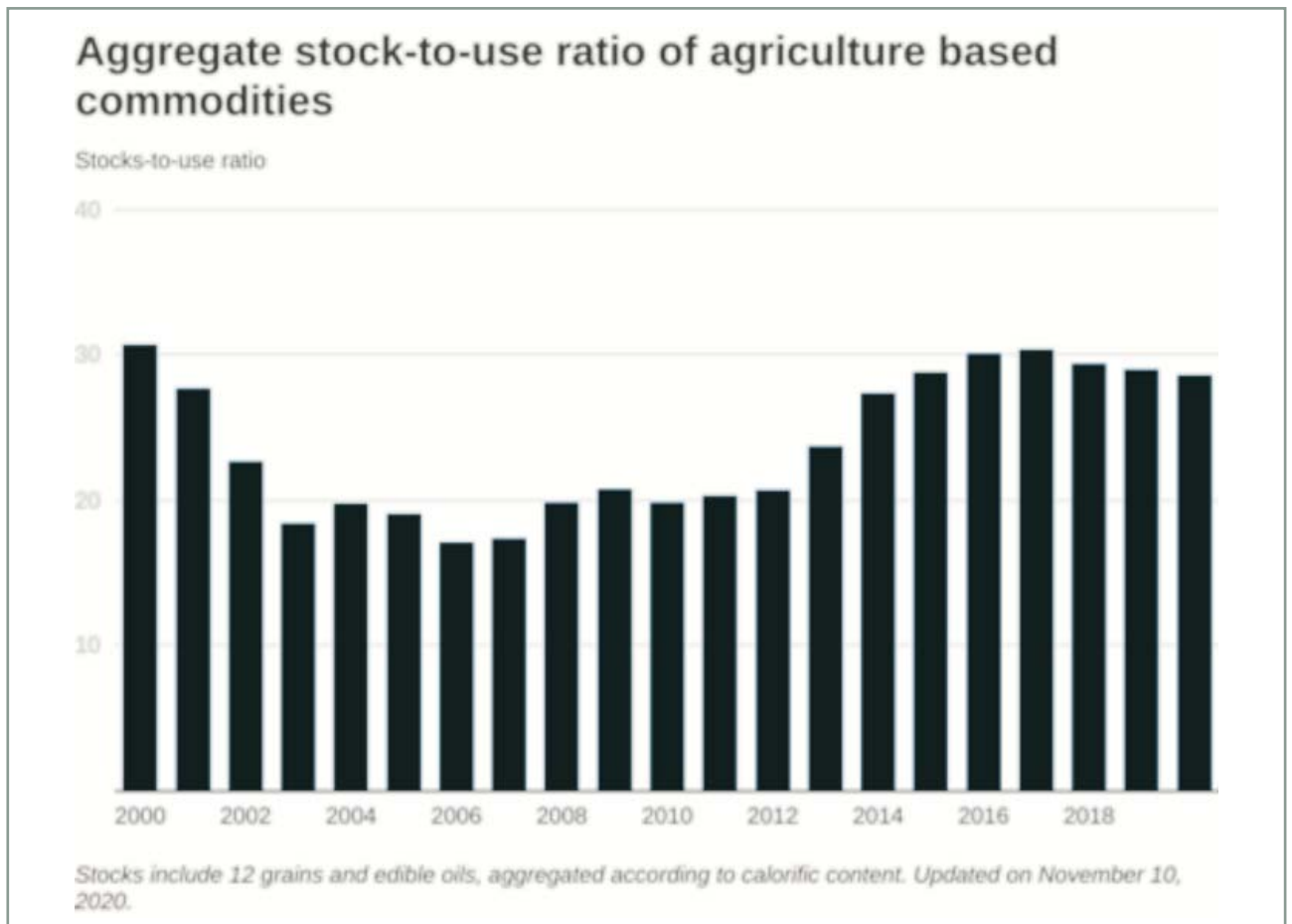
Source: World Bank, October 2020

Consistent with the relative food price stability of the past six years, the global markets of major food staples have been well-supplied compared to recent history.

The aggregate stocks-to-use ratio, a

measure of demand relative to supplies (which includes 12 major grains and edible oils) has averaged nearly 30% since 2015. This is up from less than 20% during 2007-11, a period which includes food price spikes in 2007 and 2011.

// Figure 46. Aggregate stock-to-use ratio of agriculture based commodities



Source: US Department of Agriculture, World Bank

Nevertheless, the food price outlook is subject to various risks over the next five years:

1. Energy costs. Energy is an important cost component to most crops, with direct channels like oil prices and indirect channels of chemical and fertilizer prices. Prices for both energy and fertilizers are expected to rise in 2021; by 9% and 3%, respectively over 2020. A slower-than-expected recovery in energy and fertilizer prices on the other hand could push production costs down for grains and oilseeds, thus dragging their prices downward.

2. Macroeconomic conditions. Further U.S. dollar weakening will put more upward price pressures for agricultural

commodities, especially the ones that are highly traded such as wheat, rice, and edible oils. Of course, currency movements of countries that account for a large share of global trade of commodities like Russia, and Brazil could also affect the price outlook.

3. La Niña. The El Niño-Southern Oscillation climate phenomenon is currently in the La Niña phase. According to the National Oceanic Atmospheric Administration, La Niña conditions began earlier in 2020 and are expected to continue through the Northern Hemisphere winter and into spring 2021. It could increase yields of some crops in the Northern Hemisphere, such as maize and wheat, but also reduce yields of these crops grown in the Southern Hemisphere due to added dryness.



“ FUTURE TRENDS IN THE GLOBAL FOOD CHAIN ”



The biggest postwar period changes to the global agriculture industry are happening right now; from shifts in consumer preferences to technology-enabled productivity improvements to turmoil in domestic and international markets. It is vital for agribusiness stakeholders to factor the changes and the potential disruption that comes with them.

The past ten years have seen unprecedented growth in protein demand across the globe. Total global meat consumption rose by about 2% a year, nearly half of which came from China. Industry participants capitalized on this growth through investments across the protein value chain: meat-processing giants vertically integrated upstream through acquisitions of genetics, feed-manufacturing, and animal-production companies; animal-health and nutrition companies pursued geographic and portfolio expansion; and laboratory start-ups attracted investment capital to pioneer tissue-culture engineering and other novel animal-production systems. As household incomes in emerging markets (EM) continue to grow, demand for meat-based products will also increase yet the supply of meat globally faces bottlenecks as food production is not keeping pace with population growth.

The next ten years are going to look notably different from the past decade. Next ten years will be an era marked by macroeconomic, demographic, and nutrition-driven-preference shifts presenting threats and opportunities for current industry participants and entrants alike. While aggregate consumption of meat proteins will continue to rise, the growth rate is expected to slow by as

much as 50% to 1.0 to 1.5% a year with growth concentrating in isolated regions. Changes in global meat consumption will be driven by local growth patterns while population and income per capita growth in emerging markets will continue to propel demand for meat proteins. One future trend in meat protein demand will be rising differences in dietary preferences that will create divergent patterns of protein consumption around the globe.

Beyond local growth stories, a broader trend will emerge. Animal-protein-replacement products such as plant-based proteins and synthetic meat are increasingly competing for share of protein consumption in select markets, encouraged especially by consumers' concerns over the environmental impact of livestock production. Producers will have to reconsider whether their operational and investment strategies are aligned with the demand shifts under way as they will be re-positioning their assets to capitalize on demand driven opportunities as the protein demand changes structure.

The retail landscape is being reshaped by structural channel shifts as well with its speed to gain pace in the coming years. A business model battle is under way in retail, with the e-marketplaces emerging as the uncontested leaders. Retailers seeking to meet changing consumer needs want to stand out from competition. Hence, they are looking beyond stagnant large brands. They will be more interested in selecting smaller, high-growth brands and model disruptors. Across the food industry, smaller brands are realizing more momentum than larger brands or private label due to the ability to capture an

intimate brand story at moderate scale. Food may skip the step of stopping at grocery stores and start moving directly from warehouses to household doorsteps when at the same time, people will demand more traceability and independence. A “renaissance in home cooking” will benefit the small farmers, and local grocers with the home cooking resurgence will be a continued expansion of the farm-to-table movement. More food processing will return to the local level as processors cut back their production. Meat and poultry shortages brought on by COVID-19 will mean increased prices and demand by the consumers.

In the scope of e-commerce and applications, a megatrend that will shape the way retailers operate will be drones used in food delivery especially in large metropolitan areas and remote regions; autonomous vehicles combined with drones to significantly shorten delivery times; and the emergence of restaurants closed to the public but dedicated to the delivery of finished products. Agri-food tech expected to be a post-pandemic growth industry.

The democratization of technology is a critical element of the heightened competition and will be more so in the coming decade. Advancements have made a range of tools affordable for even the smallest companies, leveling the playing field and lowering the barriers of market entry; a trend that will gain pace in emerging markets. Many of these start-ups have embraced leaner operating models and a much shorter go-to-market cycle, all supported by technology, in the process gaining an advantage over larger incumbents. Consumers have responded favorably making many quick, small investments versus a few big bets is the

future of the food industry.

Flexibility and agility in production; innovative distribution such as customized packaging for perimeter categories and use of technology for building traceability systems are new areas for future food sector investments.

Emerging markets with their solid growth rates and a burgeoning middle class, urban growth that reduces household size while rising income will still be the key words in the future of the food sector; while resource depletion and climate change will continue posing major challenges.

Hence looking beyond COVID-19, there appears to be four major trends that will greatly influence the direction of the agriculture sector in the coming years for a more resilient future and these will have a flow of effects extending to every corner of the agriculture sector:

1. We will eat differently. Emerging economies are catching up to the protein-consumption levels of developed ones, and both are battling obesity. Continuation of this trend would mean increased demand for protein-rich foods and the future hence holds a rise in alternative-meat products. To fight obesity, global consumption of fruits, vegetables, nuts, and legumes will have to double, and consumption of foods such as red meat and sugar will have to be reduced by more than 50%. The negative effects of livestock on climate change could as well turn cultured meat - “Meat 2.0”- mainstream. Meat-replacement products like soybean protein, potatoes, sunflower oil, and pea protein will hit the markets.

Empowered by digitization, millennials who have more spending power than any other generation are more diverse, more sophisticated, and more demanding. They prefer to shop in channels beyond the mass market and gravitate to up-and-coming brands rather than established ones. Compared with baby boomers, for example, millennials are 2.8 times more likely to believe newer brands are better or more innovative and 3.7 times more likely to avoid buying from “big food.” In addition, millennials are more inclined to engage with “non-brand-generated” content such as consumer reviews and social media. More important, perhaps, is how the behavior of millennial consumers is influencing shoppers across generations. Increasingly, consumers are demanding experiences, not just products.

Consumers are redefining what “healthy” and “better for me” mean, increasingly demanding products that are natural, green, organic, and free from additives. Indeed, a focus on health and wellness is no longer a strategic differentiator but a must-have for many categories.

2. We will source from different places. New regions of food production—notably sub-Saharan Africa and East Asia—could emerge. The change in traditional agriculture geographies will be led by lower energy costs and climate-related challenges such as drought and higher temperatures in some places. Lower energy costs can help some areas that are now unfit for agriculture be arable by cutting the cost of sourcing or desalinating water and pumping it to land deprived of it.

Changes in other parts of the world could make places such as Africa more viable for increased agriculture production which

is currently the wild card in the agriculture industry. Despite the huge potential in Africa as a continent, so are the challenges in terms of access to energy and irrigation, and the need for basic infrastructure. The Chinese infrastructure investments in Africa could be a turnaround in accelerating the continent's rise toward self-sufficiency and that would affect exporters into Africa, such as France, Russia, and the United States.

3. We will produce and trade food differently. Technological advances in agriculture will increase transparency and traceability across the value chain. This aims and is likely to increase efficiency, reduce waste; yet shrink profit margins. Digital technologies are increasingly widespread across the agricultural value chain, reducing information asymmetries, and boosting production yields to new highs. In the coming years, only the producers that have mastered precision agriculture will be ready to take advantage of the next-generation agriculture technologies. This era will feature the proliferation of biotechnologies, gene editing, and automation, including agricultural robots that will monitor fields and harvest crops.

Digital platforms that enable full transparency and traceability across the food value chain create an environment in which actors in the value chain can more easily buy and sell to each other, compare prices, and review and rate suppliers. This environment could lead to the emergence of online-trading platforms for agricultural products based on virtual currency.

Transparency that comes with digitalization could also decrease margins for intermediaries such as distributors and

traders. In fact, trading margins of agriculture commodities have been shrinking, dropping from 15% in 1998 to 9% in 2018. Lower returns make the ability to be cost competitive-which today is largely achieved through technology adoption-even more relevant.

The increased penetration of mobile devices and digital profiles is creating an unparalleled volume of data for knowledge companies to collect from a wide variety of consumer and non-consumer sources. At the same time, advanced tools and techniques are enabling companies to interpret vast amounts of data, allowing them to create highly personalized microsegments. Purchasing behavior is increasingly influenced by algorithms used for recommendation, and companies are relying more on search-engine optimization to promote products online. In stores, retailers are using data to personalize the shopping experience, from mobile recommendations to targeted communications and product information.

4. We will conduct trade with different rules as governments will support agriculture with different incentives and private sector will keep on investing on change. Government intervention and subsidies could reshape market dynamics and have long-term effects on global commerce. While meeting the UN's Sustainable Development Goals (SDG), several transitions in government interventions will be made. Government's will support healthier and nutritious diets; sustainable agricultural practices that protect and restore nature; more inclusive livelihoods; and greater efficiency in the production, distribution, and consumption of food. "Agroecology" which can be summarized as "climate friendly agriculture" will start shaping the government's Hence, incentives will

address regulatory framework. The costs of behavioral change mitigate the costs of transition and, potentially, fund the economic costs of change.

Today on a global scale, governments spend USD 570 billion annually on public support for agricultural producers. These subsidies are focused on achieving important priorities, such as eliminating hunger and reducing poverty, yet they are not designed to incentivize the behaviors that will achieve today's broader vision for food systems. The future governments will have to realign incentives in the policy and regulatory environment, use public-sector investments to change the economics that drive companies, investors, and smallholder farmers. Funding these transition costs and any resulting risks, including implementing appropriate safety nets, is important for protecting and compensating vulnerable stakeholders in the food system.

The need for a deliberate food system action, in fact has led to 34% increase in global assets that consider ESG in portfolio election and management. No doubt the future holds significantly higher climate and health-related risks which will unlock significant institutional capital for the agri-food sector. However, to unlock this financing, challenges related to unfavorable risk-return profiles for investments, lack of intermediation vehicles, limited information and market data, and constraints in the enabling environment should be addressed.

Unlocking behavioral change at scale requires business-model innovations to make healthy food affordable for consumers, public investments to educate consumers on the need for change, and taxation and pricing policies to encourage behavioral shifts.

Investments are required now to build resilient food systems

The OECD-FAO Agricultural Outlook 2020-29 highlights the need to invest now in building productive, resilient, and sustainable food systems in the face of uncertainties.

Over the coming decade, supply growth is expected to continue to outpace demand growth, leading to declining real prices of most commodities. Most output growth is expected to come from productivity improvements rather than from additional land area or animal numbers. Aquaculture is expected to overtake capture fisheries as the most important source of fish worldwide within a few years. While population growth will remain the main driver of global food demand, the nature of demand is changing. Environmental and health concerns in high-income countries will contribute to a shift away from animal-based protein, and income growth in middle-income countries to a shift towards diets with more animal protein and other higher value products.

Overall, given current policies and technologies, agriculture greenhouse gas emissions are projected to grow by 0.5% annually. While this represents a reduction in the carbon intensity of food and agriculture production, without additional efforts it still falls short of what the agricultural sector could do to contribute to Paris Agreement targets and national contributions for fighting climate change.

The agricultural risk landscape is shifting, with producers increasingly confronting new sources of risk caused by a changing climate, unanticipated changes in policy,

or the economy-wide effects of shocks external to the agricultural sector, such as the global COVID-19 pandemic. Confronting this landscape will require disciplined application of a holistic risk management strategy - specifically, ensuring that decisions are no longer made from a paradigm of reactivity, but from a more proactive “resilience” perspective instead. This implies focusing on preparedness, with the goal of either reducing the negative impact of events, or significantly reducing the likelihood that those events occur.

An agricultural risk management approach based on resilience - defined as the ability to prepare and plan for, absorb, recover from, and more successfully adapt and transform in response to adverse events is needed.

To design the future amidst the combined threat of COVID-19 and climate change, green budgeting tools and a new tax policy is required. Robust tax policy tools, in particular carbon pricing, can work “hand-in-hand” with green stimulus to promote clean investment and spending decisions, and support a successful, long-term recovery, according to new OECD findings. Carbon pricing reinforces green stimulus measures and helps align traditional stimulus with climate objectives, even when it is not explicitly targeted towards decarbonization.

Humans have significantly altered three-quarters of the earth's surface. We have destroyed over 85% of the world's wetlands. And between 1990 and 2015, we cut down an area of native forest 16 times the size of France. The rate of species extinction is unprecedented and accelerating, driven by land-use change, over-exploitation of natural resources,

climate change, pollution, and invasive alien species. If we do not make transformative changes in our systems, values, and behaviors, we will see further declines in nature for decades to come. And with it, a rising risk of disease outbreak. Deforestation, habitat degradation and fragmentation, agriculture intensification, wildlife trade and climate change have all played a role in zoonotic diseases.

Hence, while a serious crisis should never go to waste, COVID-19 and climate change propel a brand-new future for the global food sector to come to life in the few years ahead.

G1 //

DECOUPLING ECONOMIC GROWTH FROM RESOURCE USE: THE ERA OF GREEN DEALS

The “European Green Deal”, as proposed by the European Commission (EC) at the end of 2019, is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.

The European Green Deal is at the heart of the EU's strategy to drive the economic recovery from the COVID-19 pandemic, through Next Generation EU, the Eur 750 billion recovery instrument announced in May 2020. Additionally, EU Member States have begun announcing national recovery plans that go beyond the contributions of the EU, some of which have substantial green components.

Reaching the targets of the European Green Deal will require action across all sectors of the economy, including:

- Decarbonizing the energy sector through renewable energy projects, especially wind and solar, and kick-starting a clean hydrogen economy.
- Investing in environmentally friendly technologies.
- Supporting industry to innovate.
- Rolling out cleaner, cheaper, and healthier forms of private and public transport.
- Ensuring buildings are more energy efficient and supporting the circular economy.
- Working with international partners to improve global environmental standards. South Korea's Green New Deal of July 2020 is part of a wide national strategy to create 659 000 jobs and help the country overcome the economic crisis while addressing climate and environmental challenges. South Korea will commit approximately USD 61 billion in five years (2020-25) to boost renewable energy capacity to 42.7 GW by 2025 from 12.7 GW in 2019 and expand the green mobility fleet to 1.33 million electric and hydrogen-powered vehicles. The plan also promises refurbishment of public rental housing and schools to make them zero-energy, and transformation of urban areas into smart green cities.

Progress towards green growth can be evaluated against trends in carbon dioxide (CO₂) intensity of GDP, as CO₂ emissions are the primary driver of climate change. The carbon intensity of all OECD and Key Partner economies has decreased since 2000 showing that CO₂ emissions increased at a lower rate than real GDP, thus achieving relative decoupling. Beyond decreases in economic activity, this reflects shifts in industrial structure and the energy supply mix, and improved energy efficiency. Still, global CO₂ emissions continue to grow, mainly due to increases in emissions in the transport and energy sectors. The level of decoupling between CO₂ emissions and economic growth is far from sufficient to achieve the aims of the 2015 Paris Agreement, which would require steep reductions in total global emissions.

There comes in the Climate Smart Agriculture (CSA) which is an integrated approach to managing landscapes-cropland, livestock, forests, and fisheries--that address the interlinked challenges of food security and climate change. While production is struggling to keep up as crop yields level off in many parts of the world, the declining ocean health, and natural resources-including soils, water and biodiversity-are stretched dangerously thin. The challenge is intensified by agriculture's extreme vulnerability to climate change.

Investments for CAS will be the main funding schemes of the next decade. As climate change is stressing agricultural production, the problem also works in reverse as agriculture is a major part of the climate problem generating 29% of total GHG emissions. Additionally, 1/3 of food produced globally is either lost or wasted and addressing food loss and waste is critical to helping meet climate goals and reduce stress on the environment.

CSA aims to simultaneously achieve three outcomes:

1. Increased productivity: Produce more and better food to improve nutrition security and boost the incomes especially of 75% of the world's poor who live in rural areas and mainly rely on agriculture for their livelihoods.

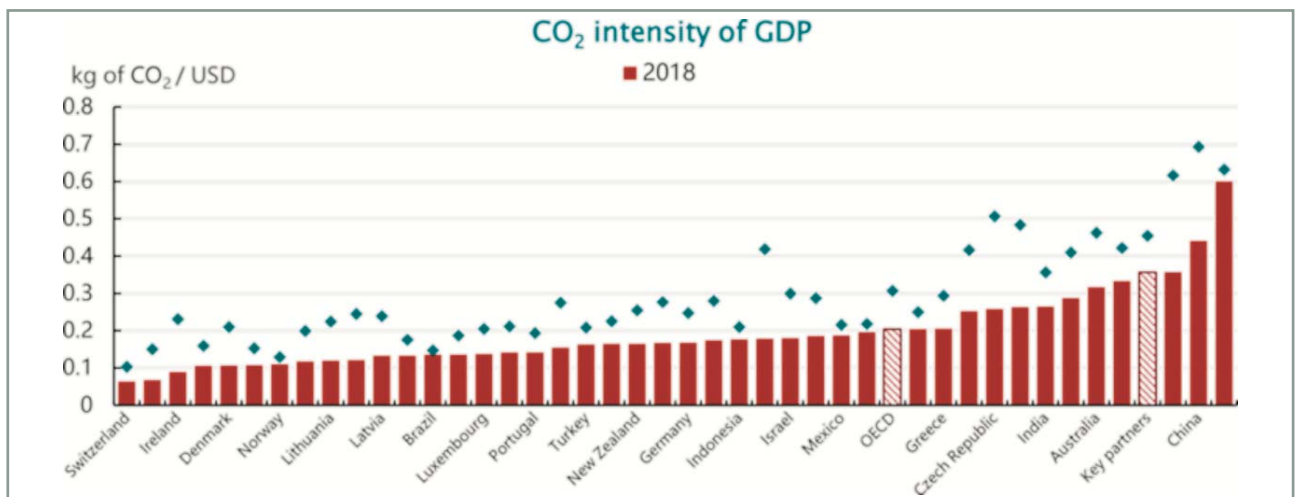
2. Enhanced resilience: Reduce vulnerability to drought, pests, diseases and other climate-related risks and shocks; and improve capacity to adapt and grow in the face of longer-term stresses like shortened seasons and erratic weather patterns.

3. Reduced emissions: Pursue lower emissions for each calorie or kilo of food produced, avoid deforestation from agriculture and identify ways to absorb carbon out of the atmosphere.

While built on existing knowledge, technologies, and principles of sustainable agriculture, CSA is distinct in several ways. First, it has an explicit focus on addressing climate change. Second, CSA systematically considers the synergies and tradeoffs that exist between productivity, adaptation and mitigation. Finally, CSA aims to capture new funding opportunities to close the deficit in investment.

The World Bank Group in its Climate Change Action Plan as well as its 2025 Targets to Step Up Climate Action, is committed to working with countries to deliver climate-smart agriculture that achieves the triple win of increased productivity, enhanced resilience, and reduced emissions. In 2020, 52% of World Bank financing in agriculture also targeted climate adaption and mitigation. The WB will also increase its focus on impact at scale and be rebalanced to have a greater focus on adaptation and resilience.

// Figure 47. Carbon Emission



Source: IEA (2020), IEA CO₂ Emissions from Fuel Combustion Statistics (database).

**TURKEY:
CRACKS AND
OPPORTUNITIES**

**3
PART**

“
STRUCTURAL
PROBLEMS AND
STATE SUPPORT
SCHEMES”



Turkey's unique geographic and climatic advantages result with a wide range of agricultural production. Yet, unaddressed structural problems have long been a drag on productivity. Such rigidities prevent Turkey from adapting to the challenges in the food systems which will be imposing serious challenges in the coming decades. Turkey's stagnant food sector exports at USD 17-19 billion also reflect how such an agricultural capacity is not being utilized at the optimum.

Such rigidities can be listed as follows:

- The small scale of cultivated lands averaging to 6 hectares and its scattered layout. The average of 6 hectares is almost the same with Greece and Portugal; close to Italy. While such small business account for the majority with 67%, this majority cultivates only 22% of the total arable land in Turkey. Hence, 78% of the land is processed by larger than average enterprises according to the 2001 Agricultural Census.
- “Law on Soil Conservation and Land Use” (No: 6537; 30/4/2014) that aims to unify arable land raise the average farmland in Turkey; yet will only be effective with inheritance through time, hence is not an immediate solution to the economies of scale problem for small agriculture businesses.
- The loss of competitiveness in grain production especially in the lands dependent on rainfall with no built irrigation systems. Scale problem is observed mainly in field crop areas and especially in cereal growing regions.
- Aging of the agricultural population; intense migration from rural to urban migration; low education level and low

financial literacy of farmers,

- High informality rate; high rate of unpaid family labor; high rate of hidden unemployment,
- Low yield and quality in grain production due to limited irrigation and dry farming,
- Mainly subsistence production; low and volatile income levels; lack of alternative sources of income,
- Inadequacies in the post-harvest process, deficiencies in the protection and marketing of the product,
- High raw material imports; fertilizers and animal feed inputs especially,
- Lack of qualified intermediate staff; limited number of true professional entrepreneurs,
- Weak institutional structure, statistical data collection problems,
- The ineffective good agricultural practices that make agriculture unsustainable,
- Difficulties in accessing finance, especially for the family farmers,
- Farmers' income is relatively low compared to the EU and volatile in Turkey. Although farmers are many in numbers relative to other links of the food value chain they have little influence on market price as they are unorganized,
- Ineffective agricultural cooperative system with economic, legal, and institutional problems hindering the benefits from “economies of scale” and better marketing,

- Low level of R&D investments; failure to incorporate innovation; inadequate mechanization,
- Despite wide range of state support to the agriculture sector, no feedback of such support about effectiveness and efficiency,
- Long supply chain with too many intermediaries,
- Ineffective use of soil and water- the most important natural resources in agriculture,
- Limited orientation towards value-added products,
- Inefficient functioning of the agricultural product markets,
- Inadequate development of physical, social, and cultural infrastructures in the rural areas.
- High costs of digital farming.

H1 // STATE SUPPORT SCHEMES AND THE FUTURE

For any country in the world, agriculture sector is among the most important strategic sectors with governments trying to meet the challenges brought forth with the climate change and population increase in the next 30 years. Hence each year a sizable USD 570 billion is directed to the agriculture sector in various ways.

While many scholars argue that such a large support distorts price-volume relationship from time to time making food more expensive for consumers, the governments try to adapt their agricultural schemes to the changing conditions. Yet nevertheless they keep supporting farmers; especially those family farmers around the world who are populated in the rural with less education and opportunities.

The modern agriculture sector state support schemes not only try to boost production but also try to extend its grasp on a wider perspective of the food systems. COVID-19 proved how human, livestock and environmental health are interrelated with regards to the food systems. Hence, regulation needs to grow out of only production and distribution and become more holistic to counter the very harsh climate related problems of the future extending into fast developments in the agricultural technology.

Food safety, food security, food nutrition quality, environmental health, climate change have all become inseparable concepts when it comes to designing agricultural support schemes.

Turkey is no different in that sense. However, one single factor that differentiates Turkey's agricultural support schemes is that they are mostly short-term oriented aiming to solve the immediate problems faced in the food sector. With not much feedback about the effectiveness of the state supports that add to roughly 1.5% of GDP each year down from 4-5% in 1990's, the decisions mostly serve political purposes as the governments seek for quick and tangible results for consumers/voters.

Up until the 2000's Turkey's agricultural policy schemes mostly aimed at food security for an increasing population.

With the formal EU candidacy, harmonization of the food sector to the EU norms gained priority in the state's policy actions. As the EU progress faded over the past five years especially, Turkey's 11th Development Plan covering 2019-2023 dropped priority to the EU harmonization and replaced it with vaguer terms. Yet with bulk of Turkey's food exports directed to the EU, meeting up to the EU norms is still a particularly important anchor in the government's policy making.

The supports to producers are either through direct price supports or transfers from the budget in Turkey. Yet while the share of price supports in the total has a share of 20% in the EU and declining, its share in Turkey is as high as 70% for the recent years. The remaining 30% of the agricultural subsidizes come from the budget in the form of duty losses of the agricultural public sector companies, subsidized loans of the state agriculture bank "Ziraat Bank", R&D efforts related to agriculture, irrigation and infrastructure spending, direct subsidy payments to producers related to the level of production for various products, diesel support and agricultural insurance support. Just very recently, with drought a major threat to agricultural production and Turkey lagging in implementing modern irrigation systems, state grants to a tune of 50% of the cost are directed to individual farmers who build drip irrigation systems while the state banks have also been supplying subsidized loans for the same purpose.

Agricultural policy and support schemes are not only built on direct or indirect transfers from the budget to the domestic markets. Policies regarding export and import schemes when it comes to food are also a major part of agricultural policies. Turkey's government from time to time lowers the import tax for various food items, mostly when there is domestic production shortage of that food rapidly pulling up the prices. This option was employed in 2020, during the COVID-19 breakout as it was also used during 2015-2019 for meat and livestock imports.

Under the conditions summarized, Turkey's climate diversity and fertile soils have let Turkey's farmers to continue with production with the state only fine tuning its support schemes over the past 30 years. Yet, the future necessitates a new approach in forming agricultural policies. Agricultural policies focused on political returns have failed to increase the productivity of the farms and consequently the income of the farmers. To sustain Turkey's competitive advantages in agriculture, the government policies and the support schemes would have to go through a profound change. A change that would prioritize technological transformation of the agro-food sector, putting emphasis on productive agricultural practices and especially strengthening the weak links on the value chain.

For the coming few decades Turkey's governments also must consider supporting / managing:

- a more equitable distribution of value added that reaches all the way down to the farmer,

- a cheaper transformation to digitalization in the food sector that can increase productivity at the farm level and traceability at the consumer level,
- a broader vision to mitigate the expected negative impacts of the climate change that will be increasing droughts and

- extreme weather conditions,
- a clearer support scheme that will include food logistics starting from railways across Turkey down to supporting the digital transformation of the transformation companies so that food loss is minimized,

// Figure 48. Turkey Food Sector SWOT Analysis

| STRENGTHS | CHALLENGES/THREATS | OPPORTUNITIES |
|---|--|--|
| Strong biodiversity, rich climate, vast arable land and local employment force | Domestic and international political frictions | COVID-19 disruptions paving the way for structural changes |
| The worlds largest 9th country in agricultural production | Lack of transparency in rules and regulations, insufficient education of farmers | Efforts to stem the reasons for high food price inflation and reverse the trends |
| Foreign trade surplus in the food sector | Economic instabilities such as exchange rate fluctuations, rising logistics costs with TL weakness | Efforts to catch up with the world through new agricultural policies |
| Presence of a strong and competitive food industry | The low size of average arable land, ownership structure difficulties | Investments on digitalization of agriculture and food systems |
| Long-term GDP growth and disposable income growth (with stagnation in 2016-2018, but expected recovery in 2021 after the COVID19 slowness in 2020) | Unsustainable agricultural policies and insufficient statistical data in the agri-food sectors | To capture economies of scale, efforts to speed up land integration through state support |
| Large population base: young and growing, middle and upper middle class are growing | Unregistered economy that creates unfair competition | State support and increase in modern irrigation projects |
| High and increasing urbanization rate | Labeling laws limit health-related claims, and regulations limit alcohol advertising, new labeling and advertising restrictions being developed on salt/fat/sugar content. | Regional development policies |
| Strong and steady retail market growth | Competition from many products imported under FTAs or European countries with lower tariffs | developments in the logistic sector in line with digitalization |
| Unsaturated market, open for new items; ability to develop packaged confectionery products and ready to eat meals | The depreciation of the TL and high food inflation is increasing the costs of operating restaurants, resulting in increased prices for consumers. | Consumerism that dictates better, healthy, cheaper food production |
| Internationally traveling new generation open to more new tastes from abroad | Economic volatility since 2018 pulling down disposable income leading consumers to dine at home slowing growth in the restaurant services sector | Demand for locally produced healthy food |
| Growing demand for high value packaged food; ready to-eat/cook meals as the share of working women increases | Climate change related droughts and excessive weather situations along with irrigation problems | Rising number of large-scale corporate farms |
| Fast growing modern organized grocery chains | Degradation of agricultural land and water resources, arable land lost to urbanization | Rising traceability along with digitalization |
| Strong food culture and tradition of gathering for meals in large groups, so new products fitting into existing food culture and eating habits are easily adopted | Young generation's lack of interest in agriculture | Reverse urbanization after COVID-19 in some parts of the country with professionals attracted to food production |
| Many regulations are similar to those of the EU, so the expansion to Turkey can be easier for companies already exporting to Europe | Low R&D, innovation efforts in the food sector | Rising cooperation with global institutions, firms |
| Functioning agricultural insurance system | Low financial illiteracy of the farmers and difficulties in reaching finance | Efforts to introduce agricultural production planning |
| Expanding use of renewable energy supported by the state | Unsustainable debt level of farmers | Rising e-marketing/direct farm to table sales after COVID-19 |

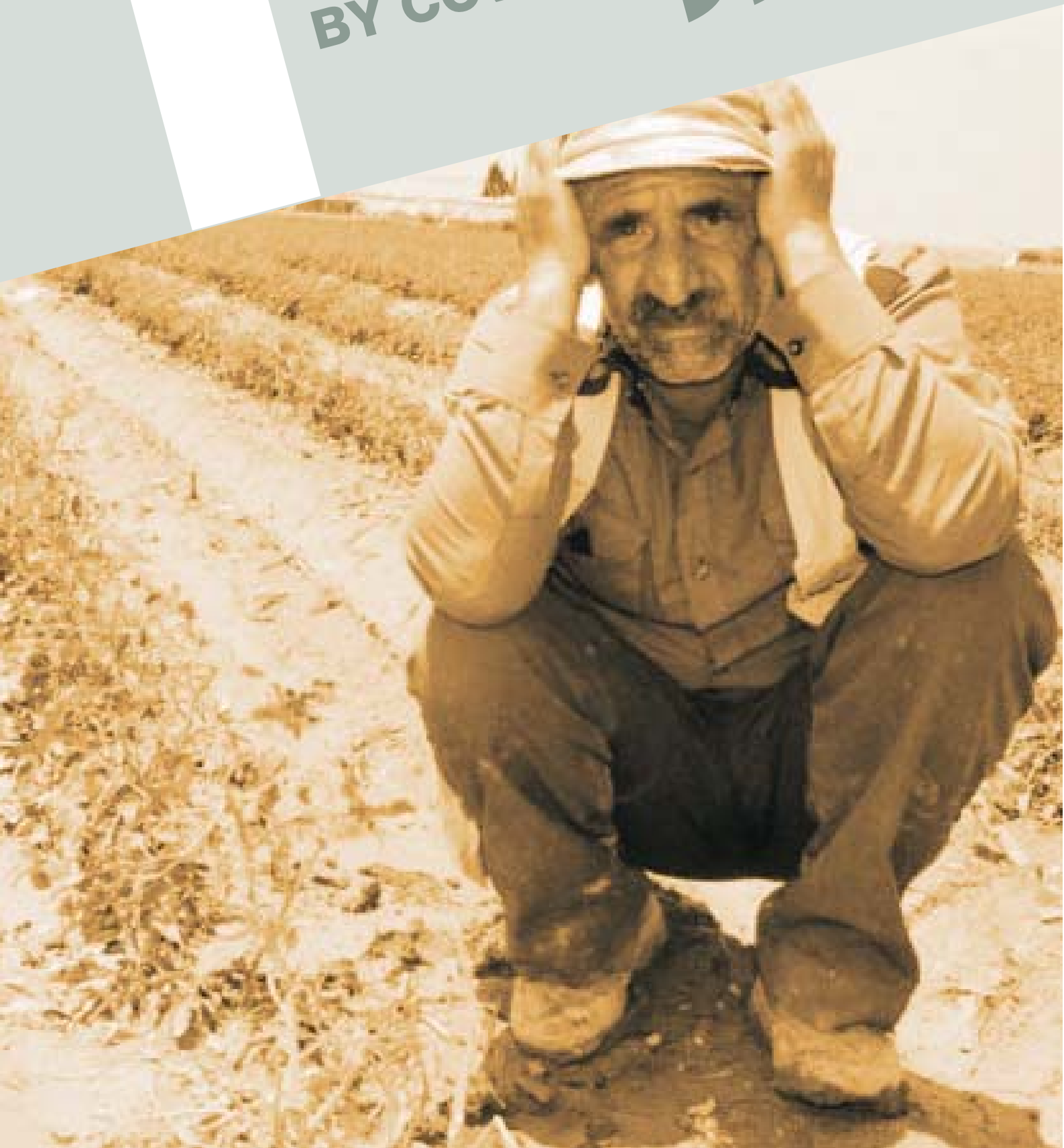
Source: Egeli&Co.

- a more democratic approach to converting “cooperative” system in Turkey that can meet the challenges of changing food systems, help in education of the farmers about more effective and efficient ways of production, help farmers with their branding- marketing processes so that value added is distributed more evenly making agricultural production more sustainable in Turkey. As low income generation of farmers is a threat to the sustainability of agriculture in Turkey, efficient farmer organizations may help farmers to secure higher incomes.

The share of revenue farmers get from the products they produce is low and volatile as their output is being processed on the way for final consumption. The effect that producers have on the market price is limited since the concentration of value added is on the intermediaries of the very long value chain. Hence, farmers and their organizations do not have enough financial and structural power to control the value chains. This situation can be improved by producers uniting under few but financially and corporately strong cooperatives that have professional managers to intervene “the farm to fork” value chain.



**“ FARMERS' DEBT PROBLEM
IN TURKEY EXACERBATED
BY COVID-19 ”**



In Turkey's agricultural sector, farmers' income has been decreasing especially in the past five years. Financing problems related with higher input prices, marketing problems, natural disasters in recent years are now escalated by the distortions created with the COVID-19 pandemic.

Within the framework of various decisions taken due to COVID-19 that started in March 2020 in Turkey, along with the state regulation banks have postponed and restructured loans that have matured, and execution procedures have been suspended until the end of July 2020. When the execution procedures resumed since August 2020 a sizable number of farmers appear unable to make down payments required for restructuring their debt, banks at an increasing extent refrain from restructuring the farmers' debt. Hence, executory processes initiated in recent months have increased.

According to the data of the BRSA, the cash loan balance used in the agriculture

and fisheries sector in Turkey was TL 106.3 billion as of the end of 2019. From the end of 2019 to September 2020, credit use in agriculture increased by 15.6% to TL 122.9 billion. If you add the loans extended through "Agricultural Credit Cooperatives" around TL 9.0 billion, agricultural loans reach TL 132 billion (USD 18 billion) as of September 2020.

Out of the total debt of farmers from banks, TL 89 billion (USD 12 billion) of the debt is due for the public banks, TL22.2 billion (USD 3.0 billion) is to foreign banks and TL 11.7 billion (USD 1.6 billion) is owed to domestic private banks. As of September 2020, 4.3% of the total loans provided by banks are categorized under the problematic follow-up loans adding to TL 5.3 billion (USD 750 million). Roughly 8% of the farmers' debt to banks has been restructured.

During 2015-2020 there was an almost two-fold increase in non-performing loans in Turkey's the agriculture sector.

// Figure 49. Loans to Turkey's Agriculture Sector (2004-2020)

| | Bank Loans to Turkish Farmers | | Non Performing Loans |
|---------|-------------------------------|-------------|----------------------|
| | TL million | USD million | |
| 2004 | 5069 | 3,545 | 4.2% |
| 2005 | 7108 | 5,265 | 2.2% |
| 2006 | 7932 | 5,508 | 4.6% |
| 2007 | 10323 | 7,880 | 2.9% |
| 2008 | 13114 | 10,088 | 3.3% |
| 2009 | 14954 | 9,586 | 6.1% |
| 2010 | 22382 | 14,823 | 4.4% |
| 2011 | 30401 | 18,096 | 2.9% |
| 2012 | 31959 | 17,755 | 3.1% |
| 2013 | 35586 | 18,631 | 3.6% |
| 2014 | 44881 | 20,494 | 3.0% |
| 2015 | 60310 | 22,092 | 2.3% |
| 2016 | 71464 | 23,585 | 2.8% |
| 2017 | 84968 | 23,215 | 2.9% |
| 2018 | 98310 | 20,396 | 3.9% |
| 2019 | 109205 | 19,226 | 4.8% |
| 2020-11 | 123820 | 17,638 | 4.0% |

Source: BRSA

The tricky part with the restructured part of the farmers' debt is that the number of non-performing borrowers appears lower than the actual. The restructured debt of the farmers, from higher rates at around 20% as of 4Q20 versus the state subsidized loans at around 7-9% are floated by the banks; as the banks keep receiving only the interest payments of the actual loans. Hence the total amount is growing at each restructuring which is turning unfeasible for Turkish farmers to pay given the low margins they earn from their agricultural produce.

As the restructured loans exit the non-performing loans category, they are classified as performing loans, yet the reality is that a good portion of these loans are not going to be repaid.

TZOB demands that the farmer's debt should be extended over a longer term not being less than five years of maturity without interest as the Chamber point out that agriculture sector has strategic importance and that the debt of farmers now approach 50% of 2019 agricultural GDP. They also want a BRSA regulation increasing the minimum maturity to 24 months on the condition of paying an interest annually for the newly opened agricultural loans and accepting the livestock assets as collateral.



“ THE WHOLESALE FOOD
MARKET LAW AND THE
VALUE CHAIN IN
TURKEY ”



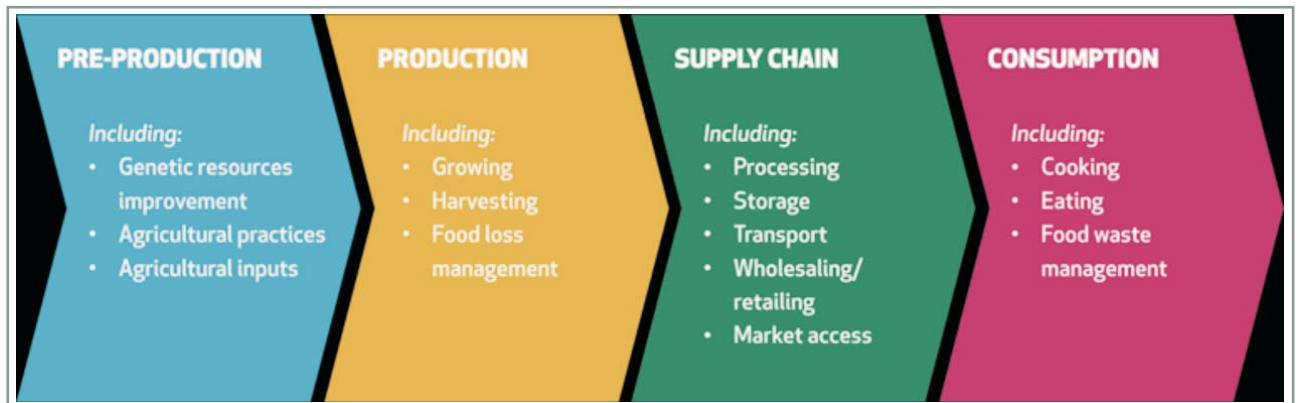
Since mid-80's Turkey's food sector is not only focused on agricultural production but on processing in the food industry to meet the demand from domestic and exports markets. Hence, as value added production has become vital, so has fulfilling certain quality standards.

Agricultural economy expanded from production for the food industry that serves foreign trade as well to solutions for environmental problems and sustainable natural resource utilization. Hence, the value chains in the food sectors across countries have become the focal point for attention.

In Turkey's special case, the structural problems in the food value chain fuel food price inflation, food price volatility. Such structural rigidities also generate low income for farmers and high food prices for consumers. Food manufacturing is the second largest industry after the automotive industry in Turkey and food products make 62% of the retail market in Turkey.

The food value chain starts with input suppliers and distributors to farmers such as fertilizers, seeds and pesticides aiming to boost productivity and value of the produce.

// Figure 50. Agriculture-Food Value Chain- From Farm to Table



Same as is in the world, in Turkey too, there are only a few firms producing such inputs- mainly foreign firms- but many farmers who buy them. The imported nature of such indispensable inputs raises production costs in the agriculture seriously due to TL's depreciation that have gained pace especially since mid-2018. Turkey being a sizable oil importer also affects food price inflation through diesel price hikes and TL weakness episodes. The same is applicable for livestock producers with major feed inputs imported from foreign countries.

So, a major reason for the high and sticky food price inflation

in Turkey starts from the first step of the value chain- that is the high input costs.

A commonly voiced problem in Turkey is the length of the food value chain. The presence of too many intermediaries is believed to be creating price increases at each step even without any food processing; hence without any real value addition. By the time the food reaches the markets and then to consumers the value added is concentrated on excessive collection, warehousing, logistics and distribution units, and the price is increased with the real food producers earning little of the value added.

The government of Turkey recently drafted a much debated “Wholesale Food Market Law” to address the intermediary problem in Turkey's food value chain. The aim of the law is to make a structural change and shorten the value chain hence lower food price inflation through better registration of the participants and the food being transferred. At the same time, it aims to reduce food waste in Turkey.

The draft law will be abolishing the “brokers' activities” in the wholesale food markets to delegate them to “merchants.” A broker is an entity that does take risks in fruit and vegetable trading. It can be defined as legal entities that deliver the agricultural product to the buyer without purchasing it from the producer and receive 8% commission in return for this intermediary.

Merchants, on the other hand, buy the product from the producer for a certain price; sell the product to the buyer. Since they buy the product, they are considered as merchants who bear all the risk of the product. While merchants are subject to income tax, brokers only pay taxes on commission amounts. In the current set up of the wholesale food markets in Turkey, the broker and the merchant can function together, but in the market their exchange with each other is prohibited. Yet, in real life, depending on the profitability of the food trading, merchants and brokers tend to be same people establishing different companies, setups.

Furthermore, with the draft law, producer organizations will be promoted, financially supported and the management of the wholesale market will change hands. Hence producer organizations can turn into cooperatives, employ professionals and have access to financing. To improve

The government of Turkey recently drafted a much debated “Wholesale Food Market Law” to address the intermediary problem in Turkey's food value chain. The aim of food safety, the draft law will enforce a classification of the products by quality standards and the imposition of technical conditions.

Complementary with the wholesale food market law, a similar control mechanism is needed for the traditional street bazaars where most of the fresh fruit and vegetable is marketed directly to consumers.

Registration of the food sold in these types of bazaars should also be considered. Furthermore, “fair trade” rules for value chains should be legislated along with the EU norms to secure a more effective and efficient functioning of the food value chains in Turkey.

Agricultural organizations in Turkey have several important problems. Among these problems, various issues related with the market access due to the existing legal regulations can be considered the most important. Producer unions' inexistence access to agricultural finance compared to individual farmers is another major problem that needs to be resolved through regulation.

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CLIMATE CHANGE, PARIS
AGREEMENT, GREEN BONDS AND
AGRICULTURAL SUSTAINABILITY
IN TURKEY”



As the world's climate continues to heat up and the impacts of that warming grow more frequent and severe, farmers and farm communities around the world will be increasingly challenged. The effects of climate change can be felt daily, especially by farmers, but very few solutions have been discussed to address this catastrophic threat.

The combination of advancing climate change and an already-vulnerable food system is a “perfect storm” that threatens farmers' livelihoods and our food supply. The good news is that there are science-based farming practices that can shield farmers from climate damage and help make their operations more resilient and sustainable for the long term. But farmers face many obstacles due to changing practices, so it is critical that policymakers shift agriculture support and infrastructure investments to accelerate this transition.



Turkey with its geographical location will be fully exposed to the impacts of climate change. Rising average temperatures, falling average precipitation and the increased frequency and intensity of extreme climate events such as heat waves and droughts will negatively affect agriculture in Turkey. Climate change will also cause significant yield fluctuations due to its impacts on crops' phenological development. Price changes due to yield losses and profitability variations will cause product pattern changes.

Climate change trends and impacts in Turkey can be summarized as:

1. Changing precipitation patterns.

Rainfall patterns have already begun shifting across Turkey, and such changes are expected to intensify over the coming years. This is likely to mean more intense periods of heavy rain and longer dry periods, even within the same regions.

2. Changing temperature patterns.

Rising average temperatures, more extreme heat throughout the year, fewer sufficiently cool days during the winter, and more frequent cold-season thaws will likely affect farmers in all regions across Turkey.

3. Floods. In Turkey there is already an increase in flooding observed in many agricultural regions of the country. These costly floods devastate crops and livestock, accelerate soil erosion, pollute water, and damage roads, bridges, schools, and other infrastructure.

4. Droughts. Too little water can be just as damaging as too much. Severe droughts have taken a heavy toll on crops, livestock, and farmers in many parts of Turkey, most notably in western and southern parts of Turkey. Science tells us that rising temperatures will likely make such droughts even worse, depleting water supplies and, in some cases, spurring destructive wildfires.

5. Changes in crop and livestock viability. Farmers choose crop varieties and animal breeds that are well suited to local conditions. As those conditions will shift rapidly over the coming decades, many farmers will be forced to rethink

some of their choices-which can mean making new capital investments, finding new markets, and learning new practices. TÜSIAD argues that the climate risks in relation to import-based supplies in primary cereals and export revenues in dried fruits and nuts are increasing gradually.

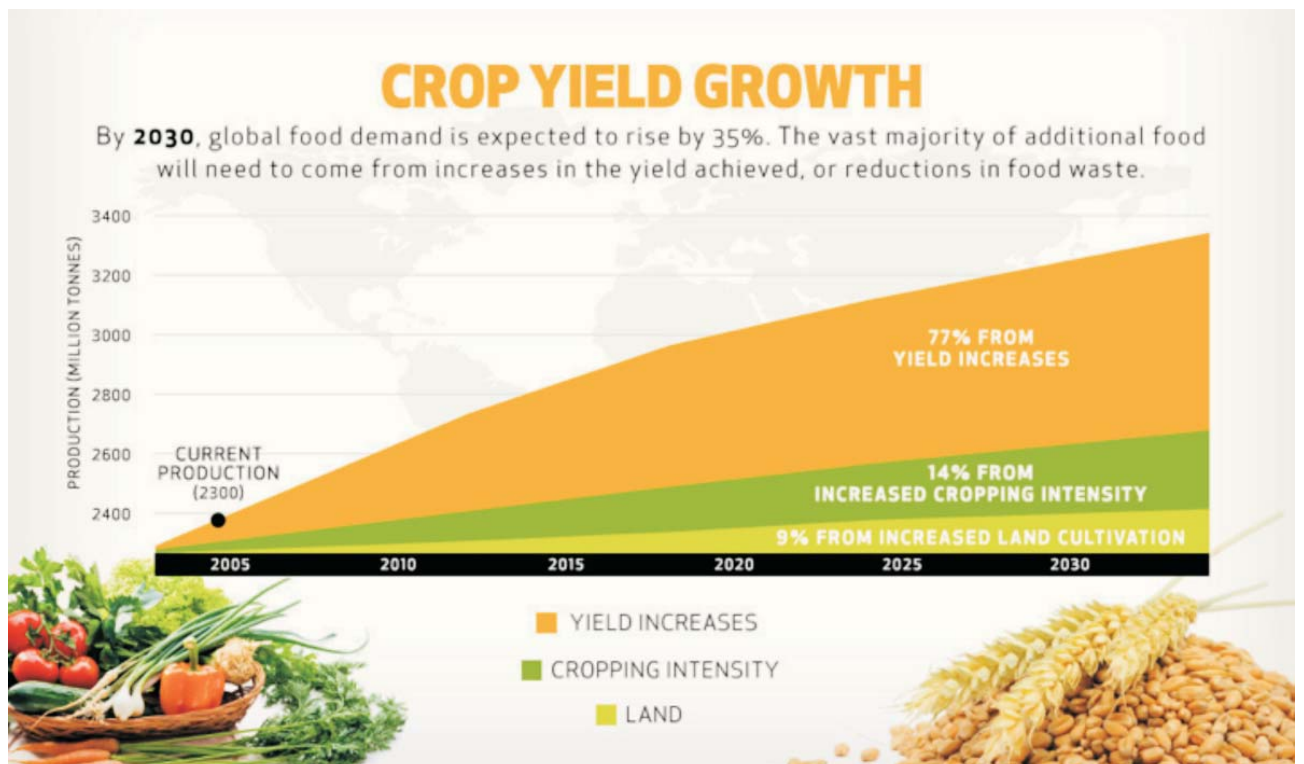
6. New pests, pathogens, and weed problems. Just as farmers will need to find new crops, livestock, and practices, they will also have to cope with new threats. An insect or weed that could not thrive in northern Turkey in past decades may find it a perfect fit going forward, and farmers will have to adapt.



7. Intensive inputs. The farmers' heavy reliance on fertilizers and pesticides may become even more costly as climate impacts accelerate soil erosion and increase pest problems. Farmers may also increase irrigation in response to rising temperature extremes and drought, further depleting precious water supplies.

8. Simplified landscapes. Agriculture treats the lands as a crop factory rather than a managed ecosystem, with minimal biodiversity over wide areas of land. This lack of diversity in farming operations exposes farmers to greater risk and amplifies climate impacts such as changes in crop viability and intruding pests.

9. Degraded soils. Typical cropping systems rely on synthetic fertilizers leaving soils low in organic matter, preventing formation of deep, complex root systems. The results are of course, reduced water-holding capacity (which worsens drought impacts), and increased vulnerability to erosion and water pollution (which worsens flood impacts).



Business as usual will not protect the future of food supply, the well-being of the farmers and communities that produce it. To make agriculture sustainable in Turkey, concrete steps to prepare for climate impacts on agriculture are needed. A good starting point would be to make a multi-layered impact analysis of the climate change in Turkey so that the governments will be able develop long-term policy action based on scientific data targeting economic, environmental, and social effects.

State agricultural subsidies should be designed to support a full transformation to pressured irrigation systems.

When climate impacts strike, support systems need to be in place to help farmers cope and recover. Investment in local capacity and infrastructure to support producers harmed by climate impacts is required. This includes not only infrastructure for communication, transportation, water, and sanitation, but also training in new practices and opportunities that build adaptive capacity.

Building healthier, “spongier” soils through practices-such as planting cover crops and deep-rooted perennials that increase soil's capacity to soak up heavy rainfall and hold water for dry periods requires agricultural production planning in Turkey. Redesigning farms to turn them into diverse agroecosystems, reducing dependence on fertilizers and pesticides, and reintegrating crops and livestock appear as a necessity for the future of sustainable agricultural production in Turkey. The government also needs to develop new crop varieties, livestock breeds, and educate the farmers on new practices specifically designed to help farmers adapt to evolving climate realities.

Turkey also needs to invest in public agroecology research to provide farmers with the tools and information they need to maximize efficiency and productivity.

With climate change, farmers need science more than ever, yet public funding for research that can help them cope is very low in Turkey.

Strengthening of the safety nets, agricultural insurance schemes will be critical in Turkey's agricultural policy practices since in the next decade almost all farmers will be challenged by the climate change with some more than others. Hence, for food security and safety reasons in Turkey's increasing population, it is essential for the governments to provide farm families and communities with the support they need to survive the climate crisis and become more resilient. This includes better crop insurance programs, and effective, responsive disaster relief programs.

Such an ambitious agenda requires the establishment of “climate change adjustment fund” as a serious project supported by state funds and freshly introduced taxes on the real sector.

One widely unknown solution to reducing the amount of greenhouse gases trapped in the atmosphere is agriculture which also produces greenhouse gasses with non-green production methods.

Reducing tillage, expanding crop rotations, planting cover crops, and reintegrating livestock into crop production systems have proven to reduce agriculture's own footprint as well as capture the excess carbon generated by other industries. This captured carbon is then converted into plant material and/or

soil organic matter, improving soil health and increasing the ability to produce food on the land in the future. These practices often reduce input costs as well. Yet, pursuing a greener production system requires farmers to embark on uncharted territories with no guarantee of immediate success and farmers usually experience decreased yields during such transition processes. A decrease in production poses a difficult financial challenge to overcome especially for Turkish farmers pressured by low margins and high costs. The government's import and export policy decisions, which heavily favor consumers over producers by keeping prices artificially low at times, also have a large impact on the ability of farmers in Turkey to adopt more sustainable practices. Hence the governments in Turkey need to find resources for making Turkey's agricultural practices greener and successful issuance of Green Bonds start with real commitment to "Paris Agreement".

Turkey urgently needs sign the "Paris Agreement" and prioritize policies to drastically reduce net emissions of heat-trapping gases. The Paris Agreement aims to keep the increase in global temperature to less than 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit that warming to 1.5C. Since 2015, 190 countries have ratified the agreement, each committing to its own "nationally determined contribution" (NDC) - an emissions reduction target and a plan to achieve it.

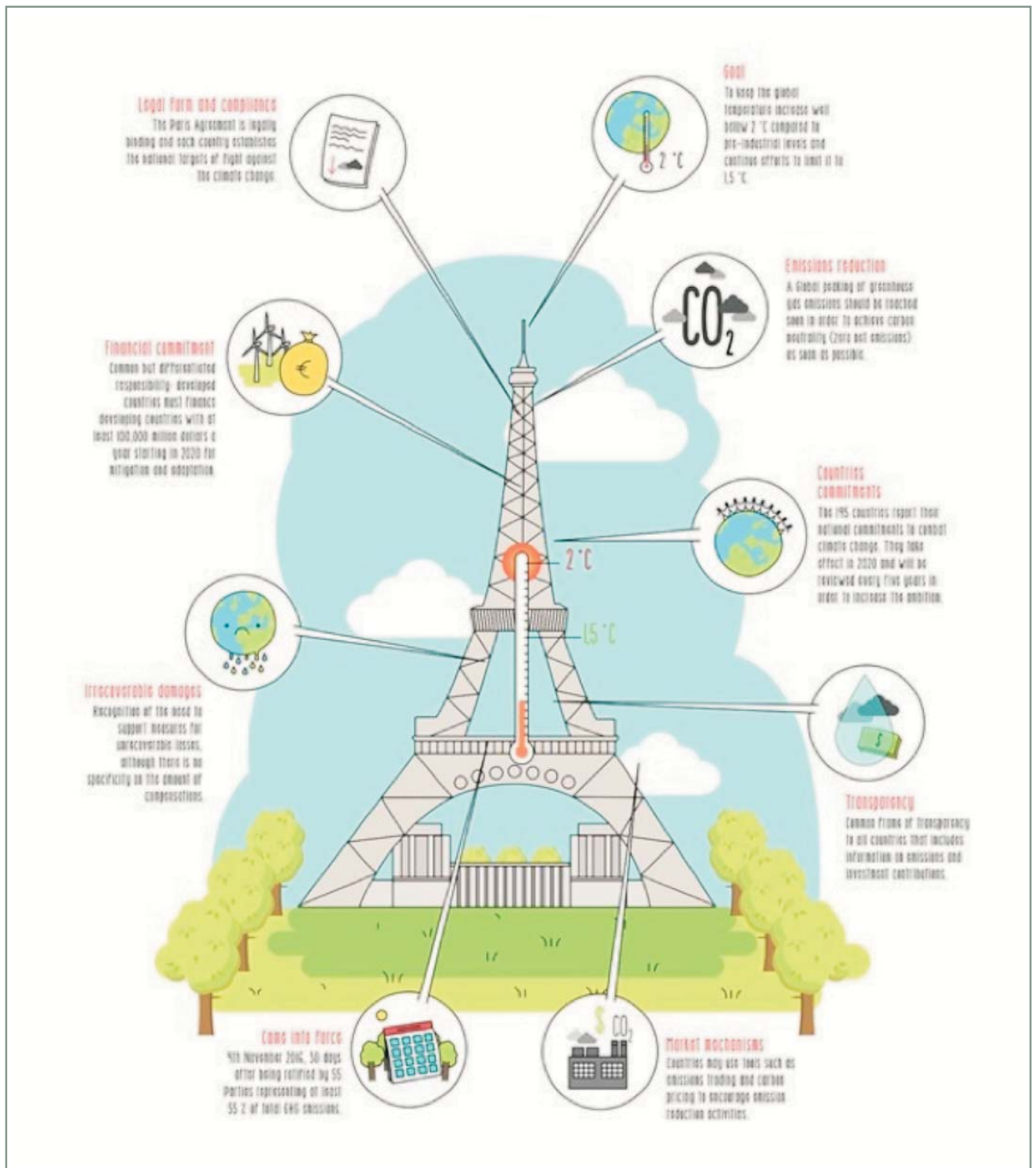
Only seven countries - Iran, Iraq, Libya, Turkey, Eritrea, South Sudan, and Yemen - are yet to sign. The most

recent available data compiled by the IEA shows Turkey is among the 20 countries which emitted the most carbon dioxide in 2018. It is ranked as the 15th largest emitter of total CO₂ (0, 42 GT) and 16th largest emitter of CO₂ per capita (5.21T). The countries that have signed the agreement pledge to spend USD 1.7 trillion over the following 10 years for green recovery.

The future of sustainable agriculture passes through effective fight against climate change and investments accordingly. Turkey will fail to issue Green Bonds and attract the much-needed investments to mitigate the effects of climate change that is very real if the government fails to ratify the Paris Climate Pact.

Turkey's private bank Akbank issued the first Green Bond in the Turkish banking sector during the COVID-19 pandemic, which amounts to USD 50 million with a 4-year 110 days maturity. The financing provided with International Capital Market Association's (ICMA) Green Bond principles compliant issuance will be used to support renewable energy projects; and supporting Turkey's transition to a low carbon economy. Akbank's efforts to initiate Green Bonds issuances in Turkey should be applauded yet the amount is very low compared to the spending in G20 countries. In fact, unless the government ratifies the Paris Agreement with a credible plan, Turkey will fail to get a fair share from the billions of dollars that will be invested into reversing climate change within the framework of UN's 2030 and 2050 targets.

// Figure 51. The Paris Agreement



Source: <https://www.activesustainability.com/climate-change/paris-agreement-what-is-it/>

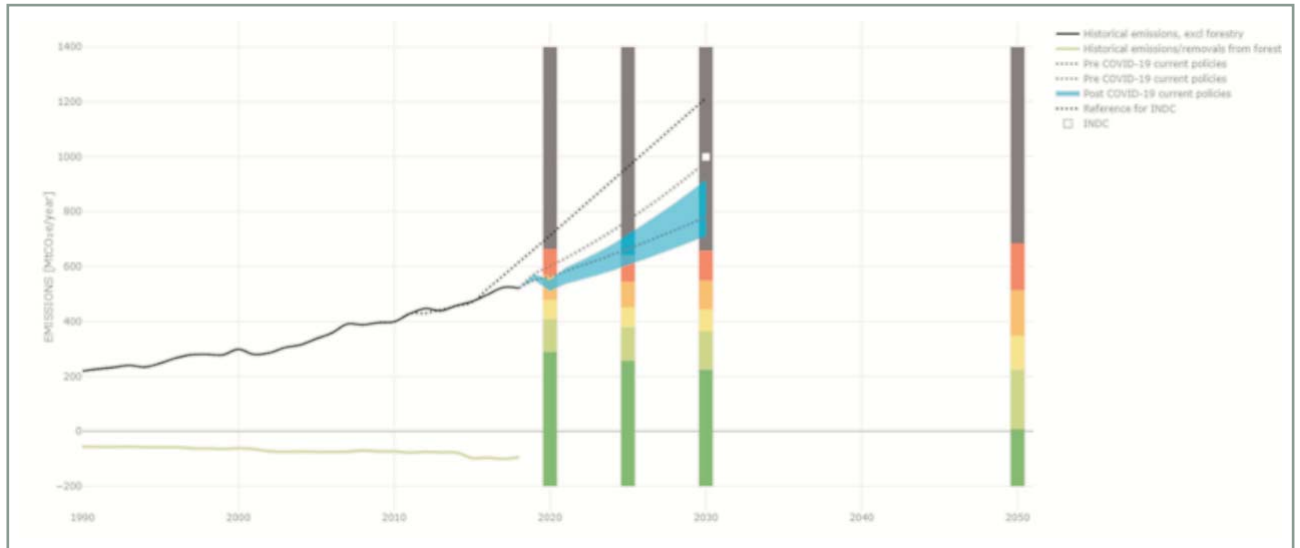
Within the G20, Turkey is the only country that has not ratified the Paris Agreement. Hence the government will have to decide for Turkey's energy future. The current government plans expect lower dependency on gas imports

through increased renewable energy capacity, but also with the use of domestic lignite coal. Climate Tracker calculates that Turkey's emissions will increase significantly under current policies, and the country is expected to overachieve

its “Critically Insufficient” - but not yet ratified proposed Paris Agreement target (INDC). This INDC appears so weak in

comparison to other countries that it allows GHG emissions to double compared to current levels, even taking the impact of COVID-19 into consideration.

// Figure 52. Turkey's Historical Emissions and Pledges for Future



Source: Climate Tracker

Turkey's emissions will be 3-5% lower in 2020 than in 2019 because of the global pandemic but will already be back at 2019 levels by 2021. Turkey's government has not initiated a green recovery stimulus plan as the post COVID-19 economic stimulus efforts focus on reviving export and production-oriented growth.

Turkey continues to rely on fossil fuels, even though costs for renewables are at record lows. The ongoing reduction in the costs of renewable energy technology and storage means that reliable power can be obtained cost-effectively without resorting to coal-powered generation. In fact, installation costs of solar photovoltaic in Turkey are among the lowest in the

world. The choices of the Ministry of Energy and Natural Resources stand in strong contrast to Turkey's need to reduce the use of coal in electricity to close to zero by 2030.

Turkey is also embarking on building nuclear power plants (NPP), having announced that three NPP will come into operation between 2023 and 2030. The first, a four unit 4.8 GW NPP at Akkuyu, is the result of a partnership with Russia's Rosatom. The second NPP at Sinop in Northern Turkey is facing difficulties after the Japanese construction partner withdrew from the project. Discussions are underway with Chinese interests for the third NPP.

“FOOD WASTE IN TURKEY”



Each year Turkey produces roughly 52 million tons of fresh vegetables and fruits that are worth roughly USD 40 billion.

Studies reveal that losses average 15 to 50% of the total production. Considering that 25% of total fresh fruit and vegetable production is wasted each year, the amount of this loss is approximately USD 10 billion. This loss does not include household consumption waste. Therefore, the loss can increase up to a sizable 40%.

Similarly, production process losses caused by adverse climatic conditions such as frost, product losses in the field due to lack of suitable prices and losses due to products not accepted for export are not included in this calculation.

Food waste between 15-50% is distributed accordingly:

- // 4-12% during harvest,
- // 2-8% during the transportation of products to the market or provinces,
- // 5-15% in preparation for the market,
- // 3-10% in the storage process and
- // 1-5% at the consumer stage

The main reasons for the losses are decays due to diseases occurring in the post-harvest period, lack of pre-cooling, lack of preservation in a controlled atmosphere, lack of proper packaging, handling and transportation.

- Losses during harvest: collecting the product before and after its time, insufficient and inappropriate collection containers, unsuitable collection methods (mechanical damage, etc.), unqualified personnel, not protecting the product from climatic conditions (covering etc.), delay in cooling, no cold storage in the producer areas, and delays during product delivery.

- Losses during packaging: unsuitable packaging materials (size, number of holes, thermal conductivity, etc.), losses arising from packaging processes (handling errors, etc.), product selection and sizing errors, absence of packaging ambient conditions (sterile environment, insufficient ventilation, and cooling, etc.).

- Losses during shipping: improper vehicle loading and unloading methods, uncontrolled movement of the products in the vehicle, the transportation vehicle not having ventilation, humidity, and temperature conditions not suitable for the product, no cooling before loading, transporting unsuitable product mixes (such as ethylene producing apples and bananas that do not produce ethylene) and losses caused by the vehicle driver.



- Losses in sales locations (market, grocery, etc.): errors during loading, unloading, transportation and handling, keeping the product in unsuitable environment (sterile, temperature and humidity conditions), late delivery to the customer and in unsuitable conditions, incorrect maturation, and storage.

- Losses in the consumption phase: products are not preserved under appropriate conditions, waiting until after the expiration date, more than necessary purchasing, cooking more than needed, and the wastes left in plates which are often the case in restaurants and open buffet hotels.

“ DIGITALIZATION AGE AND AGRICULTURE IN TURKEY”



Extensive technological progress has been resulting in fundamental changes in the global the agricultural production patterns making large productivity and value-added gains possible for the ever-increasing global food demand as per the rising population.

Countries that can keep up with technological progress in agricultural production will remain integrated into GVCs. The rest will have to rely on food imports at an increasing extent and remain locked into low value-added production.

Turkey has been a prominent global player in terms of production scale and product variety with its food and agriculture sectors. Yet, technological progress requires vision and funds, and Turkey is a laggard in employing digitalization to achieve high value-added food stuff. Turkey with its agricultural policies mostly designed to directly intervene the domestic markets to control producers, is spending a generous amount of subsidies close to 1.5% of its GDP each year yet, agricultural productivity and value-added gains have been limited with the degree of GVC integration remaining below desired levels.



Digitalization of agriculture in simple terms means an increase in data collection by way of the internet of things, like sensors, machines and

drones gathering real-time information that is stored and processed in the cloud. Digitalization will allow customizable solutions and, in some cases, will spur innovation otherwise not possible for lack of data. Experts say it is necessary to automate and digitize some of the most essential processes in farming, such as planting and cultivation to reap the benefits of optimal sustainability and gradual profitability. It is crucial to realize, that digitalization will help in meeting meet the goal of feeding a growing population, which is, of course, the biggest challenge given the limited resources on earth and the negative effects climate change on agriculture.

The detailed control of inputs allows efficiency gains like labor cost reductions, observing and preparing for climatic conditions that interfere with production processes, monitoring the spread of pests and diseases. Predictive models supported by big data and artificial intelligence enable forecasts of pest and disease outbreaks, recommendations for better seed placement in fields and selection of the best plant varieties as well as determining the best time to bring products to the market.

Precision farming is an agricultural concept involving new production and management methods that make intensive use of data about a specific location and crop. Sensor technologies and application methods are used to optimize production processes and growth conditions. In contrast to conventional agricultural methods, using digital data can increase resource and cost efficiency as well as reduce environmental impact.

Smart farming (also known as Farming 4.0 and digital farming) is the application

of information and data technologies for optimizing complex farming systems. The integration of smart agricultural technologies and modern data technologies enables seed planting to be adapted to a specific field to ensure an efficient production process. The application of information and data technologies supports farmers in making informed decisions based on concrete data.

Agribusiness start-ups are known as “Agtechs”; lead the process of the digitalization of agriculture. According to the “Agtech Investment Review”, the total capital invested only in 2018 was USD 1.6 billion in the U.S. There are Agtechs engaged in imagery, sensors, and smart farm equipment; precision agriculture; agriculture marketplace and fintech; indoor agriculture; crop protection and input management; plant sciences; and animal technologies solutions.

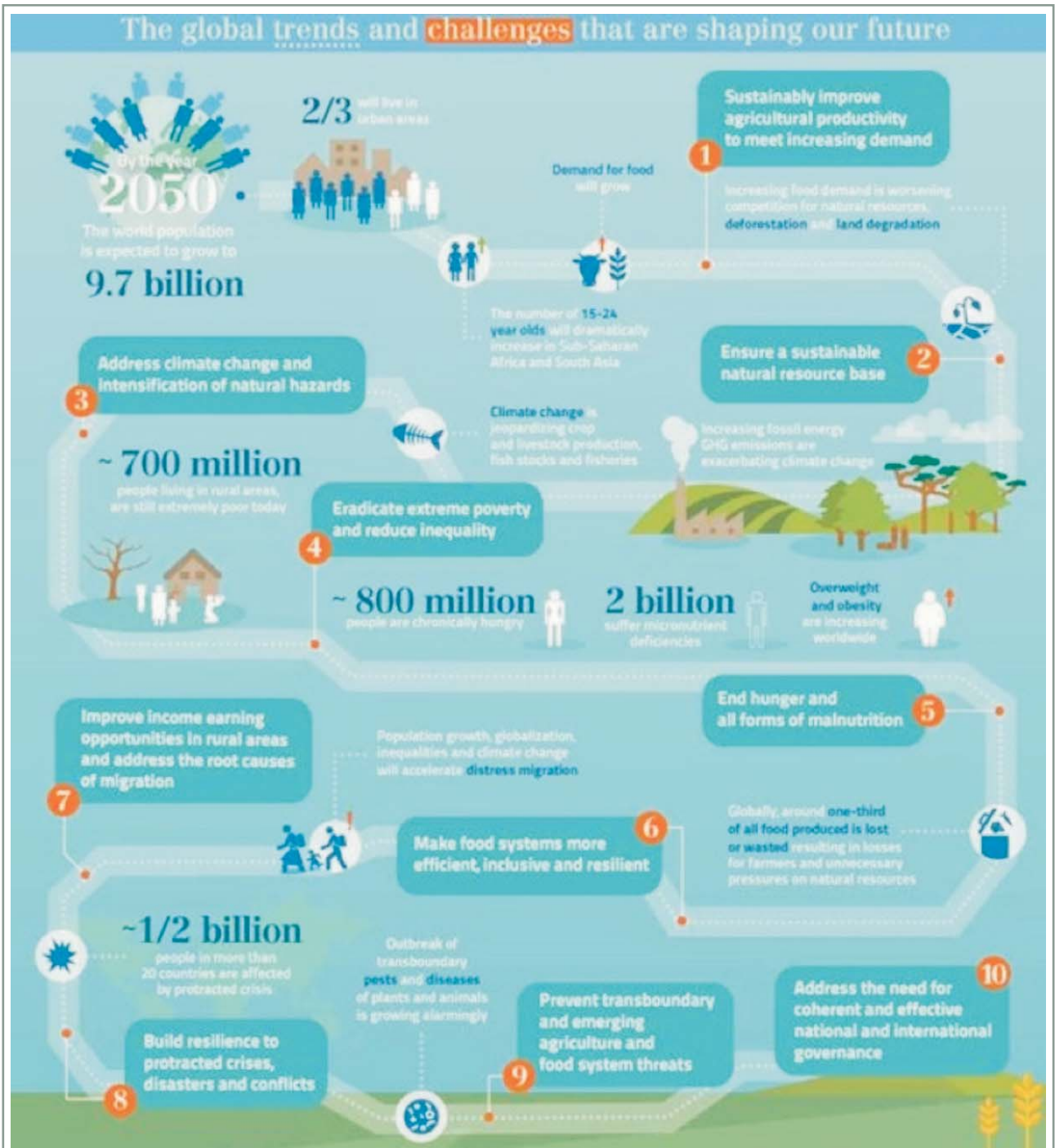
These trends force countries to review/revise their traditional agricultural policies and develop new agricultural policy tools with a specific focus on improving agricultural technologies, digitization, R&D activities, international trade, and productivity/value-added. Another key issue is how to set control and governance levels on the use of this endless information.

The financial ability and digital knowledge of farmers is another obstacle. The current financial circumstances in Turkey prevent most farmers from adopting AgTech at an optimal rate. Moreover, the lack of general knowledge about technology, its benefits and how it works also hinders digitalization.

Digital agriculture applications are in the early development stage in Turkey. To develop digital farming in Turkey, governments will have to set strategic priorities. In this context, the development of a “digital agriculture action” plan like in the EU countries, Brazil, and the USA with subsidies re-oriented will enable the expansion of agricultural production vision in Turkey. Technopolis and incubation centers of universities can be utilized in the transformation to a digitalized agriculture production and create a digital agriculture-focused ecosystem. As TÜSIAD underlines “creating well-designed/well-modelled, sustainable, scalable, and replicable, agricultural technology clusters, which bring together a variety of partners and feature well-thought financing opportunities” is the key to progress with digitalization in Turkey's agriculture sector.

To solve these issues, the course of action to be taken is related to bringing agriculture technology to the forefront in terms of adopting Turkey's agricultural policies with enough funds, working on creating the right financial circumstances for farmers and slowly but surely helping the agriculture sector get over the learning curve that is essential to utilize digitalization to its fullest extent.

// Figure 53. The Future of Food and Agriculture



Source: FAO

“ THE GAP - SOUTH EASTERN
ANATOLIAN PROJECT:
A LONG-TERM RURAL
DEVELOPMENT
AMBITION ”



GAP (South Eastern Anatolian Project) is a multi-sectoral and integrated regional development project based on the concept of sustainable development. Its basic aim is to eliminate regional development disparities by raising people's income level and living standards; and to contribute to such national development targets as social stability and economic growth by enhancing the productive and employment generating capacity of the rural sector.

The project area covers 75,000 square kilometers (29,000 square miles) and 9 provinces in the Euphrates - Tigris river basins and Upper Mesopotamia plains: Adiyaman, Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Siirt, Sanliurfa and Sirnak.

The GAP region has a share of about 11% in the total population (around 8.4 million) and 10% in geographical area of Turkey. Around 20% of total irrigable land in the country is in this region and the region represents 28% of Turkey's total hydraulic potential.

// Figure 54. Southeastern Anatolian Project



Source: MinAF

The original initiative in 1960's and 70's consisted of irrigation and hydroelectric energy production projects on the Euphrates (Firat) and the Tigris (Dicle) rivers. Along the 80's, the project was transformed into a multi-sectoral regional development program of a socio-economic character. This program covers such sectors as irrigation, hydraulic energy production, agriculture, urban and rural infrastructure, forestry, education and

health. Its water resources program envisages the construction of 22 dams and 19 power plants and irrigation schemes on an area extending over 1.7 million hectares. The total cost of the project is estimated around USD 32 billion.

As of the end of 2015, 19 dams are built and 13 hydroelectric plants are operational, with a total installed capacity of 5534 MW (target is 7490 MW) and the

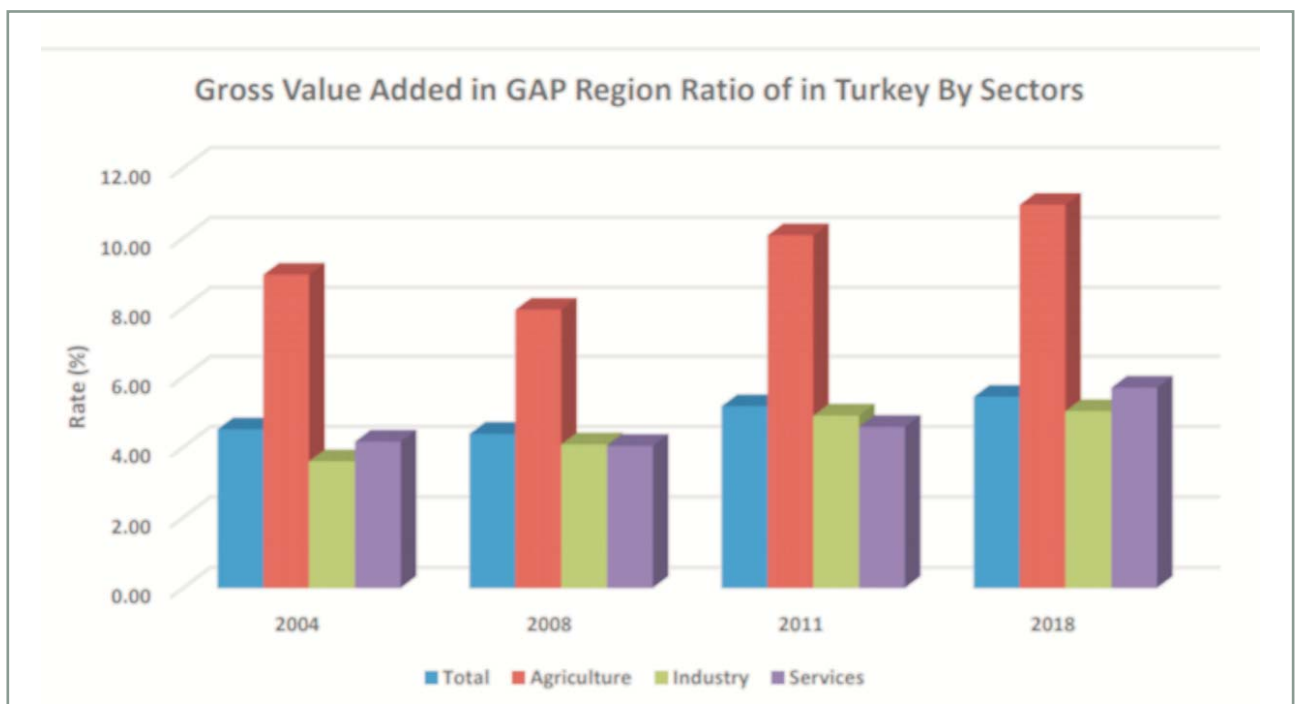
yearly production is 21 billion kWh, which is equivalent to approximately USD 1.3 billion per year in monetary terms. The project is based upon the concept of sustainable development which aims at generating an environment in which future generations can fully develop themselves and reap the benefits of development. Equitable development, participation, protection of the environment, employment generation, spatial planning and infrastructure development are the basic strategies of GAP.

The centerpiece of the GAP is the 84.4 million cubic meters (3,000 million cubic feet) rock and earth-fill Ataturk Dam, the third largest of its type in the world. Other dams and power plants are now in various stages of construction or planning in the southeast area. Such massive state investment is followed by the private sector investments to tie the southeast part of the country into the national economy. In 1997, irrigation of Harran

fields started, and farmers now are harvesting their crops, especially superb quality Turkish cotton which is considered as the second best in the world (after the Egyptian cotton). When the projects are completed, 1.8 million hectares of land will be effectively irrigated.

The basic development scenario envisaged in the GAP Master Plan is to transform the region into an "agriculture-based export center". And it will for sure change the flora in the region in a positive direction. It also improved the living standards of the people in the area. So far there are highways and double-lane roads built; six major airports in Sanliurfa, Diyarbakir, Mardin, Gaziantep, Batman, and Sirnak are functional; there are two free zones (Mardin and Gaziantep); from 96 hospitals with 9.980 beds in 2007 the region came up to 128 hospitals with 17.492 beds as of 2015; six new universities in nine provinces are opened since 2006.

// Figure 55. Southeastern Anatolian Project- Value Added



Source: MinAF

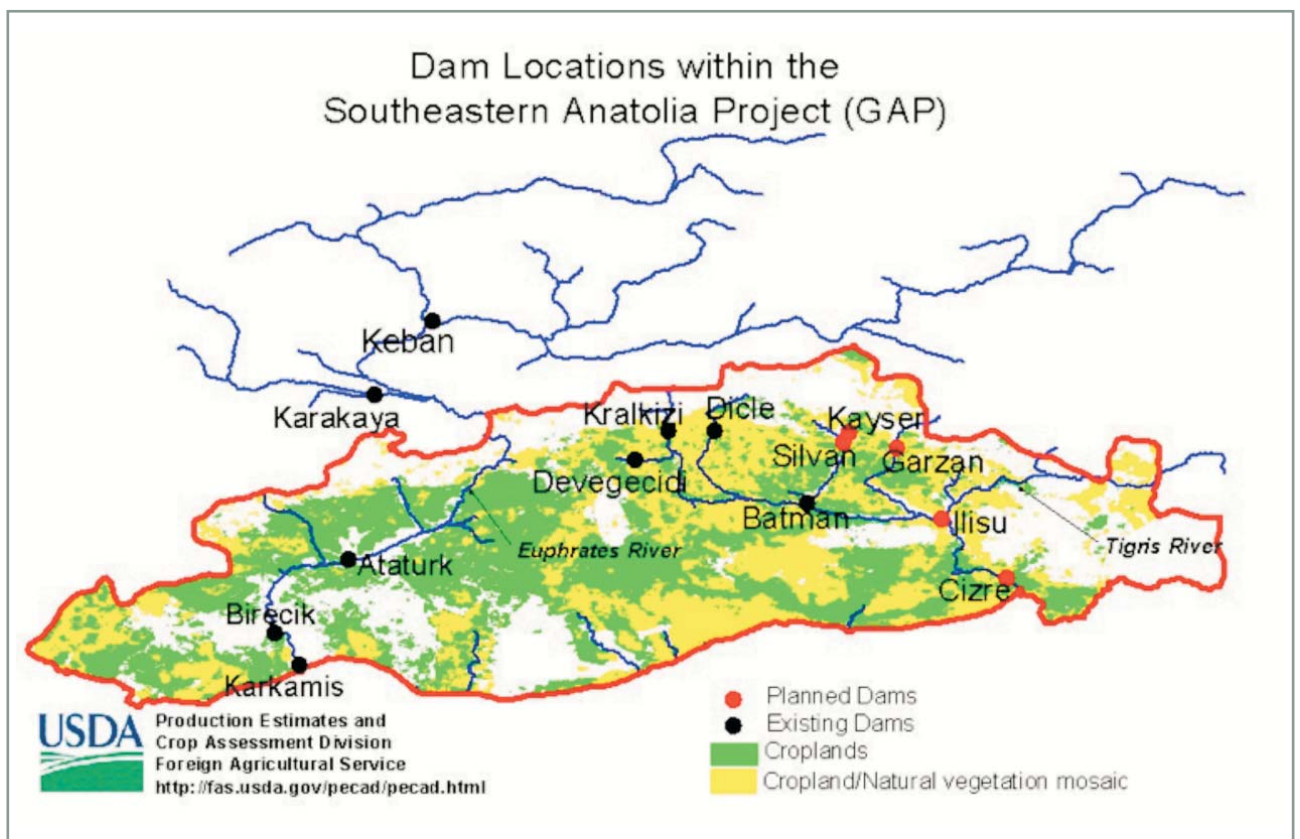
GAP has change in socio-economic structure of the region. In 2002 there were only 1102 commercial establishments in the region, with around 39 thousand employees. As of end of 2015 there are 3648 commercial firms giving jobs to 190 thousand local people. In 2002 the exports from the region were US\$ 689 million, in 2015 it topped to US\$ 8.8 billion.

While the share of the region in GDP was around 4% in 1985, it rose to 5.5% in 2001 accompanied by rate of per capita income rise from 47% to 55%.

In 2008, all developments under the GAP were reviewed and by considering the targets of the Master Plan and Regional Development Plan the GAP Action Plan (GAP-AP) was prepared for the

acceleration and completion of investments in basic infrastructure and social development including irrigation investments in the first place within the period of five years (2008-2012). After the GAP Master Plan, new approaches to economic and regional development were adopted with higher sensitivity to environmental issues along with the prominence of such concepts as human development, participation, equality, fairness, sustainability, and gender balance. The Action Plan prioritized, together with infrastructure investments, those projects and programs that would contribute significantly to technological advance and socioeconomic development and incorporated some new initiatives like attraction centers support program and SODES (Social Support Program).

// Figure 56. Southeastern Anatolian Project- Irrigation Sources



Source: USDA

The GAP Action Plan implemented in the period 2008-2012 marked a significant performance, yielding returns to efforts made, and concrete outcomes were achieved. As to the second stage of the present GAP Action Plan covering the period 2014-2018, it is built upon the consolidated basis emerging during the first five years. Important elements in this new period include urbanization, culture tourism, organic farming, renewable

energy, logistics, innovation and recreation, social and institutional development, and human resources.

About TL 83.1 billion (in 2018 prices) was allocated to GAP investments in the period 2003-2017 and TL 71.2 billion of this was channeled to investments marking a cash realization rate of 85.7%. The GAP region allocation for the year 2018 was about TL 5.5 billion.

// Figure 57. Southeastern Anatolian Project- Produce

| Products | AGRICULTURE | | | | | | | | | | | | | | | | | |
|------------------------------|--|------------------|-----------|---------------|------------------|-----------|---------------|------------------|------------|------------------|------------------|------------|---------------|------------------|-------|---------------|------------------|-------|
| | Cereals in Turkey and in The GAP Region and Cultivated Area and Production Quantities of Other Vegetable Products (Selected Products) 2005-2010-2019 | | | | | | | | | GAP / TURKEY (%) | | | | | | | | |
| | 2005 | | | 2010 | | | 2019 | | | 2005 | | | 2010 | | | 2019 | | |
| | Sown Area(da) | Production(tons) | | Sown Area(da) | Production(tons) | | Sown Area(da) | Production(tons) | | Sown Area(da) | Production(tons) | | Sown Area(da) | Production(tons) | | Sown Area(da) | Production(tons) | |
| Cereals | | | | | | | | | | | | | | | | | | |
| Wheat (Status) | 5 907 280 | 1 540 216 | 5 262 391 | 1 500 264 | 2 957 092 | 1 023 281 | 20 000 000 | 4 500 000 | 13 340 000 | 3 450 000 | 10 955 635 | 3 150 000 | 29.54 | 34.23 | 39.45 | 43.49 | 26.99 | 32.48 |
| Wheat (Grassher) | 5 758 840 | 1 443 906 | 7 805 794 | 2 138 950 | 7 032 436 | 2 197 764 | 72 500 000 | 17 000 000 | 47 840 000 | 16 224 000 | 17 507 636 | 15 850 000 | 7.94 | 8.49 | 11.53 | 13.18 | 12.23 | 13.87 |
| Barley (Malting) | 465 790 | 136 512 | 293 970 | 58 286 | 35 244 | 12 600 | 3 500 000 | 900 000 | 2 403 000 | 600 000 | 1 304 304 | 400 000 | 13.31 | 15.17 | 10.99 | 9.70 | 2.69 | 3.35 |
| Barley (Grassher) | 5 966 310 | 1 629 302 | 4 232 200 | 999 022 | 3 125 095 | 865 161 | 33 000 000 | 8 600 000 | 27 997 000 | 6 650 000 | 27 886 411 | 7 200 000 | 18.08 | 18.95 | 15.12 | 15.02 | 12.87 | 12.02 |
| Corn (Green) | 490 080 | 410 870 | 1 299 202 | 940 827 | 1 238 559 | 1 117 768 | 6 000 000 | 4 200 000 | 5 940 000 | 4 310 000 | 6 388 287 | 6 000 000 | 8.17 | 9.78 | 21.87 | 21.83 | 19.30 | 18.63 |
| Corn (Product) | 7 240 | 15 575 | 200 | 600 | 50 | 31 | 200 000 | 460 000 | 92 608 | 207 899 | 66 620 | 152 417 | 3.62 | 3.39 | 0.22 | 0.29 | 0.08 | 0.02 |
| Corn (Silage) | 38 180 | 174 187 | 96 941 | 403 361 | 387 543 | 1 781 010 | 1 800 000 | 7 600 000 | 2 844 728 | 12 446 450 | 5 007 507 | 25 499 830 | 2.12 | 2.29 | 3.41 | 3.24 | 7.74 | 6.98 |
| Legumes | | | | | | | | | | | | | | | | | | |
| Chickpea | 726 150 | 96 233 | 542 999 | 82 247 | 772 689 | 111 884 | 5 578 000 | 600 000 | 4 556 900 | 530 634 | 5 205 951 | 630 000 | 13.02 | 16.04 | 11.92 | 15.50 | 14.84 | 17.76 |
| Bean (HaricGrass) | 8 580 | 1 462 | 5 105 | 1 122 | 3 120 | 768 | 1 412 000 | 210 000 | 1 033 811 | 212 758 | 889 385 | 225 000 | 0.61 | 0.70 | 0.49 | 0.53 | 0.35 | 0.34 |
| Lentil (Red) | 3 802 070 | 511 236 | 2 071 308 | 435 547 | 2 228 387 | 289 907 | 3 867 000 | 520 000 | 2 116 000 | 422 000 | 2 427 781 | 310 000 | 98.32 | 98.31 | 97.89 | 98.47 | 91.79 | 93.52 |
| Lentil (Green) | | | | | 55 | 8 | 532 000 | 50 000 | 228 922 | 25 400 | 396 116 | 43 631 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 |
| Vetch (Green) | 4 890 | 158 | 81 134 | 10 445 | 15 937 | 2 383 | 20 000 | 2 300 | 100 785 | 12 500 | 26 060 | 3 277 | 24.45 | 23.30 | 80.70 | 86.32 | 61.36 | 72.72 |
| Vetch (Green Grass) | 4 130 | 1 188 | 49 429 | 41 050 | 3 698 | 1 732 | 20 000 | 3 300 | 99 506 | 80 305 | 25 613 | 34 855 | 21.95 | 39.40 | 49.65 | 51.31 | 37.86 | 25.12 |
| Oilseeds | | | | | | | | | | | | | | | | | | |
| Soy | 6 100 | 1 667 | 2 048 | 404 | 2 783 | 760 | 86 000 | 29 000 | 234 727 | 86 540 | 352 947 | 150 000 | 7.09 | 5.75 | 0.87 | 0.47 | 0.79 | 0.51 |
| peanut | 50 | 15 | 437 | 383 | 27 000 | 30 700 | 258 500 | 85 000 | 274 500 | 97 330 | 424 211 | 169 328 | 0.02 | 0.01 | 0.16 | 0.18 | 6.36 | 6.32 |
| Sunflower (Oil) | 29 280 | 2 619 | 66 297 | 8 130 | 82 437 | 16 695 | 4 900 000 | 865 000 | 5 514 000 | 1 170 000 | 6 719 834 | 1 950 000 | 0.60 | 0.30 | 1.20 | 0.69 | 1.22 | 0.86 |
| Sesame | 151 560 | 6 827 | 22 423 | 1 202 | 8 283 | 475 | 424 500 | 26 000 | 318 242 | 23 460 | 248 604 | 36 893 | 35.70 | 26.26 | 7.05 | 5.12 | 3.33 | 2.81 |
| Industrial Crops | | | | | | | | | | | | | | | | | | |
| Cottons (Blessed) | 2 950 950 | 1 179 252 | 2 878 947 | 1 220 804 | 2 889 140 | 1 212 703 | 5 468 800 | 2 240 000 | 4 806 500 | 2 150 000 | 4 160 098 | 2 200 000 | 53.96 | 52.85 | 59.90 | 56.78 | 69.45 | 55.12 |
| Cottons Seed (Cottonseed) | 2 950 950 | 686 779 | 2 878 947 | 722 722 | 2 889 140 | 727 619 | 5 468 800 | 1 291 180 | 4 806 500 | 1 272 800 | 4 778 681 | 1 320 000 | 53.96 | 53.19 | 59.90 | 56.78 | 60.46 | 55.12 |
| Cottons (Fiber) | 2 950 950 | 447 658 | 2 878 947 | 464 394 | 2 889 140 | 448 699 | 5 468 800 | 863 700 | 4 806 500 | 816 705 | 4 160 098 | 814 000 | 53.96 | 51.83 | 59.90 | 56.84 | 69.45 | 55.12 |
| Tobacco | 177 680 | 14 807 | 32 086 | 2 792 | 134 367 | 30 403 | 1 853 420 | 135 247 | 813 335 | 53 018 | 810 349 | 70 000 | 9.59 | 10.95 | 3.94 | 5.27 | 16.58 | 14.86 |
| Sugar Beet | 9 680 | 40 533 | 38 781 | 303 023 | 26 770 | 197 140 | 3 358 120 | 15 181 247 | 3 291 669 | 17 942 112 | 3 101 000 | 18 085 528 | 0.29 | 0.27 | 0.57 | 0.56 | 0.86 | 0.87 |
| Tuber and Bulb Plants | | | | | | | | | | | | | | | | | | |
| Potato | 1 550 | 1 205 | 2 128 | 6 014 | 10 880 | 36 910 | 1 528 000 | 4 060 000 | 1 388 640 | 4 513 453 | 1 408 967 | 4 979 824 | 0.10 | 0.03 | 0.17 | 0.13 | 0.77 | 0.74 |
| Onion (Fresh) | 16 430 | 24 159 | 16 701 | 24 146 | 8 577 | 52 817 | 133 830 | 200 000 | 308 136 | 365 478 | 84 475 | 142 257 | 12.28 | 12.08 | 15.44 | 14.59 | 10.15 | 9.01 |
| Onion (Dry) | 40 030 | 89 080 | 25 320 | 47 734 | 29 230 | 77 985 | 772 800 | 2 070 000 | 626 979 | 1 900 000 | 613 588 | 2 200 000 | 5.18 | 4.30 | 4.04 | 2.51 | 4.76 | 3.54 |
| Garlic (Fresh) | 5 050 | 7 757 | 4 425 | 6 219 | 4 691 | 7 246 | 22 460 | 27 000 | 19 566 | 21 234 | 18 730 | 23 351 | 22.48 | 28.73 | 22.62 | 29.29 | 25.05 | 31.12 |
| Garlic (Dry) | 11 940 | 6 193 | 11 327 | 7 540 | 26 783 | 26 654 | 110 000 | 82 000 | 95 100 | 76 936 | 124 357 | 103 096 | 10.85 | 7.55 | 11.91 | 9.80 | 21.54 | 25.85 |

Source: MinAF

“
POST- COVID-19
INVESTMENT
OPPORTUNITIES
IN TURKEY'S
FOOD SECTOR”



Turkey's blessed soils, lands, and plantation quality welcome food sector and agricultural farmland investors from all around the world.

Turkey has fertile soils and rich water sources combined with perfect location for export operations as the country is a regional hub for the production, processing, and export of food to large European and Middle Eastern markets. Turkey exported about 1,800 kinds of food products to more than 190 countries in 2019, accounting for an export volume of USD 19 billion.

The ability to feed its 83.3 million population, roughly 40 million foreign tourists each year and yet preserving its net food exporter position now is crowned with the COVID-19 test when the food sector experienced no food shortages. With regards to food sector, Turkey is a unique country blessed with an inherent power even to meet the challenges of a changing climate.

Turkey's food sector proved it has excellent potential, but investment is needed to help farmers update production techniques, boost productivity and cope with climate change.

Over Euro 2.6 billion of EBRD finance was devoted to agriculture in Turkey over the past decade across all the sectors required to bring agricultural goods to markets: production, processing, packaging, and distribution. The EU-Turkish cooperation in agricultural financial assistance under the IPARD has brought nearly Euro 2.0 billion in total investment to the food sector. Further Euro 1.0 billion is due for the next six years.

In the post COVID-19 world, investing in Turkey's food sector will be a win-win situation given the sustainably increasing domestic food demand based on a young and vigorous population, export potential and geographical advantages to produce and supply for both markets.

Given the natural advantages Turkey has related with the food sector, nonetheless, the ongoing challenges require investments to bring the full potential out in the years ahead where food security and safety will be a priority for nations. Turkey has significant investment opportunities in agribusiness subsectors such as fruit and vegetable processing, animal feed, livestock, poultry, dairy, functional food, fisheries, food logistics, digitalization, AgTech and enablers (cold chain distribution, greenhouses, irrigation, and fertilizer).

The Turkish government offers a set of incentives for potential agribusiness investors as Turkey is looking to position itself as the preferred option for being the regional headquarters and supply center of top global players in the agricultural sector.

With COVID-19 lessons at hand, the domestic distribution of locally produced food stuff such as meat, dairy, ready to eat food also offer interesting investment/collaboration opportunities as such distribution via online markets present much better margins to a select group of urban customers.

The challenges Turkey's food sector faces also presents major opportunities for both local and foreign investors.

In this final part of the report, post-COVID-19 food sector investment areas will be highlighted.

Post COVID-19 Investment Opportunities in Turkey's Agri-Business Sector

AGTECHS - DIGITAL AGRIBUSINESS

AgTech is an industry that encompasses diverse solutions to almost every step in the food production process. While the pandemic may have slowed the flow of venture capital funding in some segments of the packaged food and beverage industry earlier in 2020, food- and Agtech sectors saw an unprecedented influx of USD 11.6 billion on a global scale in the first three quarters of 2020.

Turkey's AgTech sector is at the very initial stage. Cost pressures are high now and Turkey needs to design agricultural subsidies restructured to encourage AgTech innovations such as was done to encourage renewable energy in years past. Yet there is ample room for:

- Water Management: Systems designed to maximize plant yield through efficient watering.
- Plant / Soil Analytics: Services to analyze soil quality and plant health.
- Sensors: IoT devices to measure the health and growth of plants.
- Advanced Machinery: Drones to monitor crops, robots to pick them.
- Predictive Analytics: Weather forecasting and other big data tasks applied to agricultural settings.
- Grocery Supply Chain Management: Food quality / safety tracking, blockchain tech.

LOGISTICS / SUPPLY CHAIN TECHS

The Covid-19 pandemic thrust the food supply chain into the spotlight like never could have anticipated: food supply chain technology for logistics and distribution. "Food Supply Chain Tech" here generally refers to the technologies that enable the processes and movement occurring between the farm gate and the loading dock or back door of the grocery retailer or foodservice provider.

| | |
|--|---|
| <p>LOGISTICS / SUPPLY CHAIN TECHS</p> | <ul style="list-style-type: none"> - Digitalization will remain a food supply chain catalyst for the next decade. - Supply chain digitalization, retailers, consumer packaged goods companies (CPGs), and foodservice companies will increasingly be able to leverage real-time data. This will help drive real-time planning and visibility, optimized inventory replenishment and ordering, agile execution, reduced waste, and better customer experiences. - Traceability will reduce food waste. - Will be linking demand to the rest of the supply chain. |
| <p>STORAGE / COLD STORAGE</p> | <ul style="list-style-type: none"> - Licensed warehousing and leased production will be developed with the aim of establishing a sufficient and secure food supply through policies that support supply security and agricultural production by making use of contemporary scientific and technological opportunities. - The channeling of production, to turn biological diversity into an advantage in international markets, investment needs in licensed storage units is strong for the foreseeable future. - Considered under the “Regional Investment Incentives Scheme” According to the investment incentives legislation from the Ministry of Industry and Technology. |
| <p>INTEGRATED LIVESTOCK INVESTMENTS</p> | <p>Turkey has a large and growing meat and dairy market.</p> <ul style="list-style-type: none"> - COVID-19 paved the way for direct e-marketing of meat and meat products, (farm-to-door) to urban population bound at home that earn high incomes. - Medium to large size farms available for mass production. - Meat and meat products supported by the state. - Considered under the “Regional Investment Incentives Scheme” According to the investment incentives legislation from the Ministry of Industry and Technology. |
| <p>DAIRY</p> | <ul style="list-style-type: none"> - Sectors like confectionery, ice cream, frozen food etc. will increase demand in livestock products, - Proximity to important markets such as Egypt, Greece, Lebanon, and Algeria, - Significant investment incentives offered for milk and dairy products. |

| | |
|--|---|
| <p>POULTRY</p> | <p>Turkey is the 8th country in the world for egg production and 3rd country in the world for egg export and the 5th largest exporting country of poultry to nearly 81 countries including Japan, Iraq, Morocco, Georgia, and the Philippines.</p> <ul style="list-style-type: none"> - Proximity to Middle Eastern countries like, Iraq, Saudi Arabia, UAE and Kuwait and Qatar creates mega opportunities for Turkish players through "Halal Food", - Attractive investment opportunities by means of M&As. |
| <p>AQUACULTURE</p> | <p>Turkey dominates markets in several EU countries and has the potential to create new market opportunities in Russia and the USA. Obtaining higher values by selling in packaged forms to European markets rather than selling in bulk. Turkish coasts and regulations allow for large-scale farming that is more competitive than the ones in the EU.</p> <ul style="list-style-type: none"> - Catchy investment opportunities for seabass and seabream thanks to the low cost of production - Value added products such as turbot, blue tuna, flatfish, sturgeon, white grouper, etc.. - Supported by the state. - Considered under the “Regional Investment Incentives Scheme” <p>According to the investment incentives legislation from the Ministry of Industry and Technology.</p> |
| <p>HIGH QUALITY SEED PRODUCTION</p> | <p>Total seed exportation of Turkey is about USD 151,691 million to 85 countries (2018). Russia, Ukraine, Iraq, Azerbaijan, Austria and Italy are the main export destinations. Total seed imports of Turkey are about USD 178,853 million (2018). Currently, there are 725 seedling companies in Turkey.</p> <ul style="list-style-type: none"> - Favorable ecology and biodiversity. - Integration with international seed systems. - Agricultural support. - Proximity to global markets. |
| <p>ORGANIC FARMING</p> | <ul style="list-style-type: none"> - Wheat, Fig, Fruits, Hazelnut, Raisin, Apricot, Lentil and Chickpea are the most exported products. - Suitable soil and sufficient technical infrastructure for organic farming. |

| | |
|---|--|
| <p>ORGANIC FARMING</p> | <ul style="list-style-type: none"> - Organic Agriculture Legislation in line with the EU, main export countries; Italy, Germany, Netherlands, France, Belgium, and UK. - Proximity to the European and Middle Eastern markets. - Available support and incentives for organic farming. |
| <p>MEDICINAL AROMATIC PLANT PRODUCTION</p> | <p>Medicinal aromatic plants are used to add aroma to food, to increase shelf life and for their healing properties in medicine and pharmacy. The increased interest in herbal medicine, organic and natural food has been supporting the growth and processing of medicinal and aromatic plants while preserving their properties.</p> <p>Defoliation facilities to be built for improving marketing opportunities by extending shelf life of the products and to increase medicinal aromatic plant production capacity is a significant investment opportunity. Processing, packaging, and storing the agricultural products.</p> <p>Processing, packing, and storing the medicinal and aromatic plants receive incentives.</p> |
| <p>NEW IRRIGATION INFRASTRUCTURE</p> | <p>Efficient use of water is a challenge Turkey needs to address, especially considering increases cases of droughts in recent years attributed to climate change.</p> <p>With its agricultural potential future challenges necessitate Turkey investing fast and investing in significant amounts to modern irrigation systems with its agricultural lands that cover about one-third of 78 million ha surface area.</p> <p>Continued demand for cheap food to satisfy continuously growing populations and changing dietary preferences and increasing competition for high reliability water from higher value economic sectors, indicate irrigation performance and the productivity of agricultural water use are likely to become more targeted at higher value enterprises.</p> |

| | |
|---|--|
| <p>AGRICULTURE-BASED FOOD PROCESSING</p> | <p>Turkey has a huge agro-industry market containing dairy products, cereal and starch products, processed fruits and vegetables, edible oils, meat and meat products, sugary goods etc. There are some highly sophisticated state of the art food processing businesses in Turkey, that have ambitions to become global players, with long term vision and a holistic approach to developing and improving their supply chains. These businesses are excellent examples of what can be achieved, and what the potential for Turkey could be with the application of improved production and processing technologies, innovation and implementation of food safety and hygiene standards.</p> <ul style="list-style-type: none"> - Processing, packaging, and storing the agricultural products. Focus for food manufacturing, developing and manufacturing innovative food products under license as well as, utilizing Turkey as a production of finished and or semi- finished products for surrounding markets, relatively low-cost food machinery. |
| <p>PRODUCTION OF FRUITS & VEGETABLES</p> | <p>Turkey is world's 4th largest producer of fresh vegetables and 6th largest producer of fruits. The sectoral advantages of Turkey, which is one of the top 10 producers of fruit and vegetables in the world, are:</p> <ul style="list-style-type: none"> - Ecological conditions, contracted production, easy marketing, and export opportunities for food processing sector. - Rapidly increasing domestic demand and the proximity to major markets such as Europe and MENA. - Significant investment opportunities with high-tech fruit and vegetable processing industries. |
| <p>CROP FARMING</p> | <ul style="list-style-type: none"> - Contracted farming opportunities; favorable climatic conditions; irrigation. - Processing, packaging, and storing. - Diversifying of plant production supported by the state. |
| <p>HALAL FOOD MARKET</p> | <p>Potential Growth Areas for Turkey to tap domestic and exports Halal markets combined:</p> |

HALAL FOOD MARKET

- **Specialty Processed Food:** The aim is to expand production capacity and increase global market penetration, especially in the following segments: convenience food, functional food, ethnic food, ethical food and gourmet food.
- **Halal Ingredients:** The effort is based on the development of alternative ingredients (product innovation), its production and trade, especially those based on palm oil. Potential product categories include functional ingredients, enzymes, chemicals and texturizers.
- **Cosmetic and Personal Care:** For this cluster, effort will be undertaken to increase market penetration and product innovation.
- **Animal Husbandry:** The attention of this cluster will be to improve or raise quality and health standards, to ensure sustainable low prices and to prevent imports.

GREENHOUSE CULTIVATION / GEOTHERMAL GREENHOUSE CULTIVATION

With its 772,000 decares of greenhouse area, Turkey is the 4th country in the world and 2nd in the Europe. Modern Greenhouses are expected to grow quickly and thanks to technology, production in greenhouses will increase significantly. There are already foreign operators in the greenhouse sector, mostly from Netherlands and Germany.

8.1 million tons of production with a total value of approx. USD 1.7 billion

Greenhouse farming breakdown is; 94% vegetable, 5% fruits and 1% ornamental plants.

- Considerably export oriented investment area.
- In geothermal resources, Turkey is 1st in Europe, 7th in the world.
- 4,344 decares of area is being heated, potentially 30.000 da of area can be heated.
- Adequate infrastructure within the special Industrial Zones.
- Rich geothermal sources of a number of provinces in Turkey- mainly close to the Aegean coast lower heating costs which makes investment environment more attractive.
- Processing, packaging, and storing the agricultural products.
- Greenhouse investments which utilize renewable energy sources receive additional incentives.
- Considered under the “Regional Investment Incentives Scheme” According to the investment incentives legislation from the Ministry of Industry and Technology.

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ABBREVIATIONS:

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|-----------|--|
| BRSA: | Banking Regulation and Supervision Agency |
| CSA: | Climate Smart Agriculture |
| CWT: | Hundredweight; there are 20 hundredweight in a ton. |
| EBRD: | European Bank for Reconstruction and Development |
| EM: | Emerging Markets |
| ESG: | Environmental Social Governance |
| EU: | European Union |
| FAO: | Food and Agriculture Organization of the United Nations |
| GDP: | Gross Domestic Product |
| GHG: | Greenhouse Gas |
| GTS: | General Trade System |
| GVC: | Global Value Chains |
| IEA: | International Energy Agency |
| IMF: | International Monetary Fund |
| IPARD: | Instrument for Pre-Accession Assistance in Rural Development |
| MinAF: | Ministry of Agriculture and Forestry |
| NASA: | The U.S. National Aeronautics and Space Administration |
| OECD: | Organization for Economic Co-operation and Development |
| SDG: | Sustainable Development Goals, UN |
| TGDF: | Federation of Food and Drink Associations of Turkey |
| TMO: | Turkey Grain Office |
| TOBB: | Union of Chambers and Commodity Exchange |
| Turkstat: | Turkish Statistical Institute |
| TÜSIAD: | Turkish Industry and Business Association |
| TL: | Turkish Lira |
| TZOB: | Turkey Union of Chambers of Agriculture |
| UN: | United Nations |
| USDA: | United States Department of Agriculture |
| WB: | World Bank |
| WTO: | World Trade Organization |



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