International
SMART JOURNAL
International SOCIAL MENTALITY AND RESEARCHER THINKERS Journal
e-ISSN: 2630-631X
SmartJournal 2021; 7(43) : 535-542
Doı : http://dx.doi.org/10.31576/smryj.846
Arrival : 24/02/2021
Published : 10/04/2021
Research Article

INCREASING THE AGRICULTURAL ADDED VALUE IN THE CONTEXT OF THE SUSTAINABLE AGRICULTURAL FOOD VALUE CHAIN: DIGITAL AGRICULTURE

Kemal ALBAYRAK
KTO Karatay University, Doctoral Student, Konya / Turkey
ORCID ID: https://orcid.org/0000-0002-7354-6384

Cite As: Albayrak, K. (2021). "Increasing The Agricultural Added Value In The Context Of The Sustainable Agricultural Food Value Chain: Digital Agriculture", International Social Mentality and Researcher Thinkers Journal, (Issn:2630-631X) 7(43): 535-542.

ABSTRACT

Rapidly increasing world population and the ongoing climate change process raise questions about the sustainability and balancing of demand and supply in the agricultural sector. According to increasing in production technology, the agricultural sector is also affected by these technologies. countries are taking a step towards a sustainable future with the changes in the agricultural food value chain, In this value chain, adaptation to technological changes has a great importance. In this study, in order to ensure continuity of supply and increase efficiency in agricultural production, the importance of Agriculture 4.0 applications for Turkey is mentioned and provides a detailed evaluation of technology diffusion, digitization, innovation, and value-added production in Turkish food and agricultural sectors, presents a descriptive analysis comparing Turkey with the rest of the world, performs statistical analyses that help us better understand the patterns of agricultural value-added production patterns, discusses the results and implications in detail, and, accordingly, recommends various policies.

Key Words : Agriculture 4,0, Digital Agriculture, Agricultural Value Chain

1. INTRODUCTION

In the international literature, the concept of economic globalization is attributed to the process of the country's economies becoming more and more integrated with each other day by day. The globalization process is seen as a process that causes an increase in social, cultural and economic interaction between countries where national borders have lost their importance and barriers in the international circulation of goods and services have been removed (Hayaloğlu et al.2015).

In many economic studies, globalization is examined in the context of growth and the benefit provided in the context of total output. Classical and neo-Classical economists argue that the benefits of globalization can arise with the increase in national income (Potrafke, 2014: 1).

With the rapidly increasing globalization level in the world, the effects of globalization such as economic growth, poverty, inequality, global dominance, climate change, and environmental pollution are also discussed (Hayaloğlu et al.2015).

The fact that globalization causes inequality in income distribution has led to the examination of many sectors, especially the agriculture and food sectors in developing countries, with value chain analysis (Fitter, 2001).

According to Porter (1985), the value of a sector is explained as the profit obtained as a result of activities that are in connection with each other and have strategic importance in that sector. In order for a sector to gain a competitive advantage in the phenomenon of globalization, it has to have lower costs than its competitors in the process of creating value or it has to show a difference compared to its competitors.

The need for food is an indispensable element for human beings to survive. The agricultural sector, on the other hand, is a sector that has a significant impact on health and development, as it is a sector that produces, shapes, diversifies and meets these needs.

The agricultural sector stands out as a sector that not only meets the food demand, but also meets the input needs for many areas. The main contributions of the agricultural sector to the economy are as follows (Guide & Erdem, 2019):

- ✓ It supplies food, which is the most basic need of the society.
- ✓ It provides basic input to the industry sector.
- ✓ It provides labor to the industry and service sector.
- ✓ It plays an important role in rural development.

- ✓ Saves foreign currency.
- ✓ It also has an impact on real growth.

Although the agricultural sector is such an important sector, the increase in the world population in recent years and the structural problems of the agricultural sector cause future concerns in terms of the sustainability of the agricultural sector. The decrease in agricultural areas due to the inadequacy of traditional farming methods, the fact that environmental pollution based on agricultural production is constantly on the agenda, the destruction of forests, unconscious grazing, excessive use of fertilizers and pesticides and the absence of a fertilizer tracking system are indicators that the agricultural sector should undergo a change.

New approaches are needed for the agricultural sector to be more efficient, more effective, more environmentally friendly, more innovative, more technological and sustainable. In line with this need, the use of digitalization, which manifests itself in almost all sectors, in the agricultural sector is on the agenda. In this study, the value chain of the agricultural and food sector in Turkey has been evaluated in accordance with the analysis approach.

In this study, agriculture and value chain of the food industry in Turkey approaches were evaluated in accordance with and is being given to the statistical data for the relevant sectors emphasized the importance of innovation to improve the agricultural value added and digital agriculture.

2. SUSTAINABLE AGRI-FOOD VALUE CHAIN FRAMEWORK

The agricultural food value chain consists of stakeholders that are necessary for the production of food products and participate in activities that create added value (FAO, 2018). In order for the agricultural food value chain consisting of stakeholders to be sustainable, it must maximize profit and provide wide benefits for the society. In the meantime, it is based on the production of certain agricultural products without destroying natural resources permanently. All agricultural operations involved in the stages of transforming these agricultural products into certain foodstuffs and bringing them together with the final consumer and then disposing of wastes are called coordinated value-added activities (Adanacıoğlu et al.2018).

According to Neven (2014), in the food value chain, everyone, including the consumer, is a part of the chain, food and agriculture have a very important share in the country's economy in many developing countries, food production is directly linked to the natural environment and quality control is difficult. The necessity of applying "good agricultural" practices and using standards and technology is a factor in the agricultural food chain being a key concept for the establishment of sustainable agriculture and food systems.

Sustainable value chain is realized firstly with the management-based functions within the enterprise. Integration into the global value chain is achieved as a result of the harmonious work of the fund providers needed with the functions that exist other than the management that provides services and inputs to these activities. Neven (2014) presented the sustainable agricultural food value chain as follows:

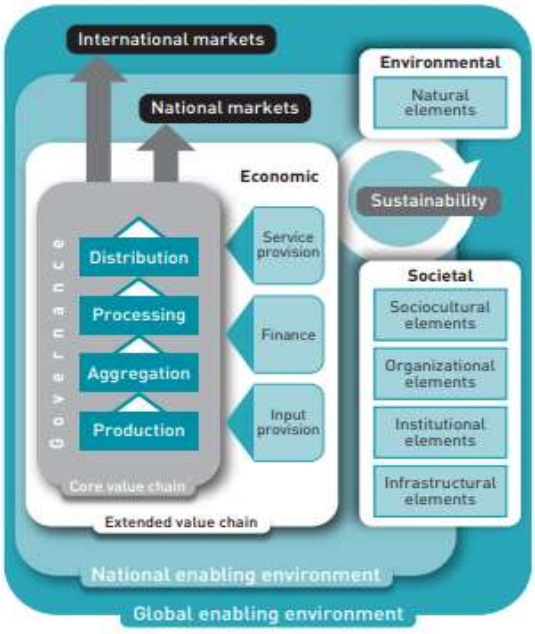

Figure 1. The Sustainable Food Value Chain Framework

It is seen that there are four basic functions consisting of production, collection, processing and distribution in the agricultural food value chain formed by Never. It is seen that sustainability will be achieved in national and international markets thanks to the fund management needed with input and service providers in the governance process until the producers produce the products and deliver them to the end consumer. The collection step has the difficulty of effectively managing the collection and storage of small-volume products, especially from small-scale producers (Adanacıoğlu et al.2018).

The agricultural food value chain operates in an environment with social and environmental factors. Social elements include socio-cultural elements such as consumer preferences, religious needs, organizational elements such as cooperatives and education centers, institutional elements such as regulations, laws and policies, and structural elements such as roads, ports and communication networks. Environmental factors include soil structure, air, water and natural resources (Adanacıoğlu et al.2018).

3. VALUE CHAIN ANALYSIS AND VALUE ADDED IN TERMS OF TURKEY'S AGRI-FOOD SECTOR

Value chain analysis has an analytical structure that strengthens the interaction of resources within the national economy and helps to understand the national policy environment (Kaplinsky & Morris, 2001).

In Turkey, mainly in studies related to the agricultural sector made available by academic and non-governmental organizations, structural problems are addressed. Turkey, agricultural land and produced in volume as the volume of added value, although not included in the top ten countries in the world in land productivity in their twenties, thirties is located in the productivity of labor as well. This situation causes related studies to be carried out. Some of the structural problems highlighted in these studies are as follows (Burrell & Kurzweil, 2007; OECD, 2011; OECD, 2016; TÜSİAD, 2016; MÜSİAD, 2010; TOBB, 2013; TIM, 2016):

- ✓ Disorganized layout,
- ✓ Agricultural parcels are small due to division,
- ✓ This small size is not enough for sustainable agricultural practices,
- ✓ Failure to stop rural-urban migration rates
- ✓ The producers are elderly population and have low education levels,
- ✓ The sector is not open to R&D and innovation,
- ✓ Having a high rate of informality,
- ✓ Insufficient incentives and support given to the sector,
- ✓ Low investment capacity
- ✓ Inability to use natural resources effectively,
- ✓ Long supply chain and too many intermediaries,
- ✓ Providing know-how from abroad,
- ✓ High costs of digitalization
- ✓ Difficulties in accessing finance.

The amount of net production obtained by subtracting agricultural outputs from agricultural inputs in the agricultural sector is called agricultural added value. The ratio of the agricultural value added of the world countries to GDP between 1995 and 2018 is shown in Figure 2:

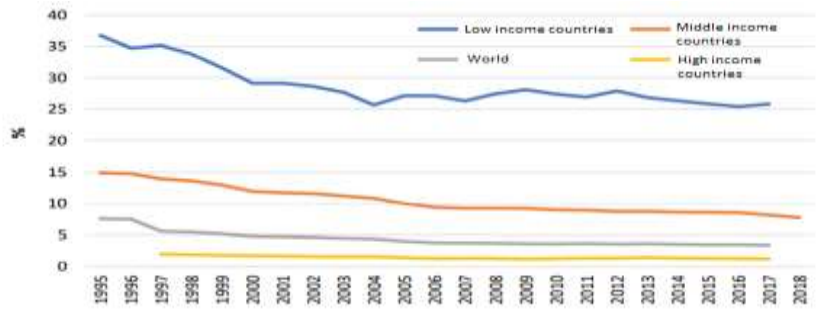

Figure 2. Worldwide Agricultural Value in GDP

Accordingly, it has been observed that there are noticeable differences between country groups and the ratio of agricultural value added to GDP. It is observed that as the national income levels of the countries increase, their agricultural added value decreases. While the ratio of agricultural added value to GDP in the world was 7.5% in the mid-1990s, it is seen that it decreased to 3.5% with a 50% decrease until 2018. Turkey's middle-

income countries, including 15%, the ratio decreased to 7.8%, and in high-income countries, which declined from 1.9% to 1.3%.

Looking at the national income levels of the EU-15 countries, it is seen that the average national income level of 10.947 billion $ in 2013 increased to 16.086 billion $ in 2013 (T.R.Ministry of Development, 2014). The 47% increase in the national income levels of the EU-15 countries within ten years indicates that agricultural value added has also increased, but decreased in percentage within the general increase.

The increase in value of the agricultural value added of the EU-15 countries despite the decrease in GDP shows that the resources used in the agricultural sector of these countries are shifting to other sectors with more added value. The use of these resources in other sectors has caused the agricultural added value to be shown with a lesser percentage of GDP. The numerical increase in agricultural added value is also an indication that developing countries have increased agricultural productivity, especially with digitalization and increased use of technology, and sustainability in production with less input (Tümen & Özertan, 2020).

The most significant share of agriculture and farming products made in regard to this area of field crops in Turkey are shown in Table 2 taken by the cultivation. While the cultivation of field crops was done on 18,868 thousand hectares in 1990, it is seen that this rate decreased to 15,398 thousand hectares by 2019. While 5,324 thousand hectares of agricultural land were left fallow in 1990, this rate decreased to 3,513 hectares in 2019, although it is seen as a positive development, but the high fallow area is remarkable.

Table 1. Agricultural Area in Turkey

Agricultural Area	**1990**		**2002**		**2013**		**2016**		**2019**	
	Ha (10^3)	**%**	**Ha (10^3)**	**%**	**Ha (10^3)**	**%**	**Ha (10^3)**	**%**	**Ha (10^3)**	**%**
Field Crop	18.868	67,7	17.935	67,5	15.613	65,6	15.574	65,5	15.398	66,3
Fallow	5.324	19,1	5.040	19,0	4.147	17,4	4.050	17,0	3.513	15,1
Vegetable	635	2,3	930	3,5	808	3,4	804	3,4	790	3,4
Fruit	3.029	10,9	2.674	10,1	3.232	13,6	3.329	14,0	3.519	15,2
Ornamental Plant	0	0,0	0	0,0	5	0,02	5	0,02	5	0,02
TOTAL	**27.856**	**100,0**	**26.579**	**100,0**	**23.805**	**100,0**	**23.762**	**100,0**	**23.225**	**100,0**

Source: TUİK

Statistical information related to Turkey's livestock sector which has potential for development of agricultural value added and located as follows:

Tablo 2. Animal Population in Turkey

#	2002	2005	2010	2016	2019
Cattle	9.924.575	10.631.405	11.454.526	14.222.228	17.872.331
Small Cattle	31.953.800	29.382.924	29.382.924	41.329.232	48.481.479
Poultry	251.100.958	238.972.961	238.972.961	333.541.262	348.784.885

Source: TUİK

Especially, as a result of the establishment of cattle breeding enterprises in international standards with the state incentives given, there was a serious increase in the number of cattle between 2002 and 2019.

Tablo 3. Turkey's Agricultural Index

Years	**GDP (Million TL)**	**% Change**	**Agriculture GDP (Million TL)**	**% Change**	**Exchange Rate**	**GDP (Million $**	**Agriculture GDP (Million $)**	**Agri. Share (%)**
2009	995.526		81.234		1,625	612.631	49.990	8,16%
2010	1.084.128	8,9	104.703	28,9	1,508	718.918	69.432	9,66%
2011	1.204.467	11,1	90.443	(13,6)	1,802	668.406	50.190	7,51%
2012	1.262.160	4,8	92.460	2,2	1,996	632.345	46.323	7,33%
2013	1.369.334	8,5	94.604	2,3	2,199	622.708	43.021	6,91%
2014	1.440.083	5,2	95.165	0,6	2,558	562.972	37.203	6,61%
2015	1.527.725	6,1	104.085	9,4	2,715	562.698	38.337	6,81%
2016	1.576.365	3,2	101.400	(2,6)	3,024	521.285	33.532	6,43%
2017	1.694.134	7,5	106.383	4,9	3,648	464.401	29.162	6,28%
2018	1.756.136	3,0	108.504	2,0	4,715	372.457	23.013	6,18%
2019	1.772.232	0,9	112.561	3,7	5,679	312.068	19.821	6,35%

Source: TUİK

Turkey in the last 10 years when agricultural indicators, the TL-based product from the agricultural sector to GDP increased by 28.9% in 2010 and is seen as having a value in the total GDP 9,66'lık% of this value. The sharp decline in the sector in 2011 caused agriculture to decrease to 7.511% of GDP. The percentage decline continued in the following years and the ratio of agricultural value added to GDP was realized as 6.35% in 2019.

According to World Bank data, total agricultural value added figures derived by Turkey's share in the world in 2015 stood at 1.70% (TUSIAD, 2020). Turkey's total 6.81% of GDP in the world in 2015 to meet such a having a low share, efficiency in production, impairment of the ability to export and a consequent inability catch the agricultural value added by world countries have not achieved the desired activities related to this sector.

The large number of small businesses with a dense and dispersed structure in the agricultural sector played an important role in the failure to achieve the desired efficiency. The fact that the cooperative system cannot be used widely and efficiently in this scale is the biggest obstacle in front of this situation. Although important steps have been taken to consolidate the agricultural lands in the agricultural sector, which is dominated by a dense and dispersed structure with small businesses, the scale size has not reached the desired level yet. The fact that the cooperative system is not widely used is the biggest obstacle to this situation (Aşarkaya, 2015).

Due to the long supply chain of some products in the agricultural sector and the fact that they cannot be organized locally, it is observed that farmers and small enterprises operating in the agricultural sector cannot be integrated in the value chain (Muchopa, 2013). In order to achieve an integration, structures supporting partnerships between wholesalers and small farmers should be established (Bresnyan and Werbrouck, 2012: 2). In this context, capacity building studies should be carried out to help agricultural enterprises, which constitute the most important link in the value chain, to adopt more sustainable practices (such as smart agriculture) (Adanacıoğlu et al.2018).

4. USE OF TECHNOLOGY IN AGRICULTURAL ENTERPRISES

Through digital data-oriented solutions to be used in agricultural enterprises, data applications and digital solutions such as data analytics, drone, robotics and automation, by providing the transformation of food systems, strengthening cooperation in the agricultural food value chain from production to consumption and subsequent waste management, scaling innovation, reducing costs and it will be possible to increase sustainability (Tümen & Özertan, 2020).

Thanks to the innovations and digital transformations used in e-agriculture, economic growth on a macro scale, increase in added value in rural areas, increasing efficiency in production, increasing the quality of life and improving the value chain will be opened. Thanks to this digital transformation, it will be possible to adapt to drought and climate change, which are important problems of the sector, to minimize risk and to use the supply chain effectively (Jouanjean, 2019).

With the digital transformation in the agricultural sector, the micro-scale use of fertilizers and chemicals that affect the sustainability of agriculture can be reduced, the transformation to changing consumer demands can be accelerated, the amount of waste can be reduced by using bio-soluble products in product packaging, and transparency in the sector can be increased (Verbeek et al.2019).

The benefits of technology to the actors in the agri-food value chain are examined below:

Manufacturer: With the technology used in agriculture, the risks faced by small businesses and buyers in the decision-making process in the market where producers are located are minimized. Digital technologies allow traditionally high-risk small landowners to better utilize their previously un-maximized assets through the production processes they realize by creating more perspective strategies. This can create an opportunity for small businesses to increase productivity, production quality and therefore total income (Jouanjean, 2019).

Consumer: new expectations and needs arise from consumers through digital transformation that facilitates access to information. Consumers' demand for more information, such as where and when the products they use come from, can increase the commercial value of the product used (Jouanjean, 2019).

Food Industry: The digital gathering of food industry businesses and consumers is an effective way to learn the demands of consumers. In this way, it will be possible for food industry businesses to provide better service, to prevent excessive costs and product deterioration rates due to reasons such as excessive stock holding in products, and to make products safer for consumers (Kelly et al.2017).

Transportation / Logistics: Especially in order to prevent problems such as disruption and unexpected changes in the delivery of fresh food to distant markets, it is possible to establish new logistics connections

and provide early warning-based logistic intelligence through timely, reliable, honest, flexible data communication (Kelly et al. , 2017).

According to Pesce et al. (2019), technology is expected to have an impact on the agricultural food value chain at three levels. These:

1. Expected High Level Impact: It will come from internet of things (IoT), robotics, artificial intelligence, and big data.

2. Expected Moderate Impact: It will come from blockchain, global satellite navigation systems (GNSS) and virtual reality applications.

3. Expected Low Level Impact: It will come from broadband networks, Information Communication Technology (ICT) and E-commerce platforms.

Considering the global adoption rates of technology applications, it is estimated that 30 million technological devices were integrated into the agri-food sector worldwide at the end of 2015 and this figure will increase to 75 million by the end of 2020. It is known that 46% of the corn harvested in the USA, 36% of the soybeans and 15% of the wheat are harvested with combine harvesters with sensors that measure data. In the US state of Nebraska, 25% of enterprises use satellite images, and 80% use yield tracking and GPS guidance systems (Finger et al. 2019).

5. DIGITAL AGRICULTURE IN TURKEY

The eleventh development plan prepared by the TR Presidency Strategy and Budget Directorate, covering the years 2019 - 2023 and accepted by the Turkish Grand National Assembly in July 2019, includes the following statement regarding the use of technology:

"In our country, in order to realize the National Technology Move, artificial intelligence, internet of things, augmented reality, big data, cyber security, energy storage, advanced materials, robotics, micro / nano / opto-electronics, biotechnology, quantum, sensor technologies and additive manufacturing Technologies roadmaps will be prepared. At the same time, it will be ensured that the necessary infrastructure is established, the required qualified human resources are trained and social orientation focuses on these areas "(article 355).

In Turkey, located in the agricultural sector, the financing of agriculture and developing innovative business models that support agricultural technology start-up organizations are located. Apart from these organizations, representatives of many foreign-based companies dealing with agricultural technology are included in the sector. In addition, there are projects of various private sector agro-food companies regarding the use of technology in agriculture (Tümen & Özertan, 2020).

With the smart agriculture feasibility project prepared by TÜBİTAK and Ankara University, analyzes were made by collecting air and ground data for sixteen agricultural products on an area of 400 hectares belonging to Ankara University. With this project, it was ensured that many data such as yield mapping, irrigation, disease and pest detection, and fertilization were obtained using remote sensing systems (Kaya 2019).

With rural development objectives that support Aydin province in Vodafone Turkey and Tabita (Agricultural Information and Communication Technology) and co-founded the Vodafone Smart Village project, to improve the efficiency of information and technology in agricultural production, increase youth employment in agriculture, is aimed to spread to other villages technology (Kirmikil and Ertaş, 2020).

According to the "OECD-FAO Agricultural Outlook: 2019-2028" report published by the OECD, in parallel with the population growth in the world, the need for products from the agricultural sector will increase by 15%. However, if there is no increase in the rate of cultivated areas globally, countries will have to realize this increase in demand with a strong increase in productivity.

The ratio of R & D spending compared to OECD countries, Turkey is one of the lowest position. In Turkey, while the amount spent on R & D sector is lower than other sectors. 2015 all R & D performed in the activities invested 20.84 billion TL in Turkey, agricultural R & D expenditure of 0.78 billion TL and food R & D expenditure stood at 0.12 billion (Akder, 2020).

The high number of small-scale enterprises and the inability to use the cooperative structure effectively is the reason why the existing R&D expenditures in the agricultural sector are so low. Due to the fact that know-how is obtained from abroad, the costs are high and the difficulty of accessing finance, both public policies

and the social responsibility projects carried out play an active role especially in the R&D studies to be carried out in the sense of digitalization.

In order to integrate small-scale farmers into the agricultural food value chain, to raise the desired level of knowledge and to carry out the coordination for technology adaptation within the sector, the institutional structure should be strengthened.

6. CONCLUSION

In the last 20 years, significant changes have been experienced in the agricultural sector throughout the world. The importance that developing countries attach to industrialization instead of the agricultural sector, and the rapid growth of developing countries in the service sector have caused the share of the agricultural sector in the global economy to fall.

While the increasing rate of urbanization causes the decrease in agricultural lands, countries are trying to increase productivity with technological and genetic methods in the food sector, which is an indispensable item of human life. Developed countries have mostly tended towards the production of products with high added value and not relying on labor force. The importance of the R&D share allocated to the agricultural sector and the effective management of digital transformation in agriculture resulting from these efforts are at the top of the acquisition of products with high added value.

Innovation and digitalization can make a difference in many sectors and trigger change. Thanks to the technological developments that can be used in all administrative stages of the value chain of the agri-food sector, it is obvious that high value-added products that cannot be reached in this sector can be reached. Technology is not a solution by acting with the idea that tools need to be resolved, especially agricultural scale of the problem that existed in Turkey. If the changes in the structure of the agricultural sector are not achieved, the effects of the technologies to be installed in the sector on the added value will not be at the desired level. The desired increase in added value can only be achieved through technological reforms combined with structural reforms.

The employment provided by the agricultural sector and the fact that the rural people execute their lives thanks to this sector are an indication that this sector cannot be ignored.

Especially the difficulties experienced by small-scale enterprises and farmers in delivering the products they obtain after the harvest to the market due to the length of the supply chain and the problems of price fluctuations caused by the inability to direct the growing amount of the agricultural food product in line with the demand should be resolved. In this way, it will both allow standardization in the product and create an environment suitable for the return of the small-scale farmer's gain in the value chain.

Scalable, repeatable and sustainable agricultural technology clusters should be created for small-scale enterprises and farmers that have found a place in the agricultural food value chain, where different stakeholders come together.

Thanks to these clusters, an ecosystem in which the public, organizations, technology companies, non-governmental organizations, scientists, investors, small-scale enterprises and farmers can act together will be realized and the resource efficiency used in agriculture will be achieved.

REFERENCES

Adanacıoğlu, H. Saner, G. Ağır, B. (2018). Sürdürülebilir Gıda Değer Zinciri Yaklaşımı. KSÜ Tarım ve Doğa Dergisi 21(Özel Sayı): 221-226.

Aşarkaya, A. (2015). Tarım Sektörü Raporu. Türkiye İş Bankası İktisadi Araştırmalar Bölümü.

Bresnyan E. & Werbrouck P. (2012). Value chains and small farmer integration. Latin America and Caribbean agriculture for development brief. Washington, DC: World Bank. http://documents.worldbank.org/curated/ en/489001468270654669/ Erişim Tarihi: 23.12.2016

Burrell, A. and Kurzweil, M. (2007). Distortions to agricultural incentives in Turkey: Main report. Agricultural Distortions working paper, No. 10. Washington, DC: World Bank.

Doğan, Z., Arslan, S., & Berkman, A. N. (2015). Türkiye'de Tarım Sektörünün İktisadi Gelişimi ve Sorunları: Tarihsel Bir Bakış. Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 30.

FAO 2018. Sustainable Food Value Chains Knowledge Platform. http://www.fao.org/sustainable-food-value-chains/what-is-it/en/. (Erişim tarihi: 27.12.2020).

Fitter, R. (2001). Who Gains from Product Rents as the Coffee Market Becomes More Differentiated? A Value chain Analysis." IDS bulletin 32/.3, p. 69-82.

Jouanjean, M. (2019), "Digital Opportunities for Trade in the Agriculture and Food Sectors," OECD Food, Agriculture and Fisheries Papers, No. 122.

Kaplinsky, R., & Morris, M. (2001). A handbook for value chain research (Vol. 113). Ottawa: IDRC.

Kelly, S., Bensemann, J., Bhıda, V., Eweje, G., Scott, J., Lockhart, J., Taskın, N., Warren, L. (2017), "Disruptive Technology in the Agri-food Sector: An Examination of Current and Future Influence on Sustainability, Bio-Security, and Business Effectiveness," Massey University, New Zealand

Kılavuz, E. ve Erdem, İ., (2019). Dünyada Tarım 4.0 Uygulamaları ve Türk Tarımının Dönüşümü, Social Sciences (NWSASOS), 14(4):133-157, DOI:10.12739/NWSA.2019.14.4.3C0189.

Kirmikil, M. Ertaş, B. (2020). Tarım 4,0 ile Sürdürülebilir Bir Gelecek. Icontech International Journal Of Surveys, Engineering,Technology.

Muchopa, Chiedza L. (2013). Agricultural Value chains and Smallholder Producer Relations in The context of Supermarket Chain Proliferation in Southern Africa, International Journal of Managing Value and Supply Chains (IJMVSC) Vol.4, No. 3, September, DOI: 10.5121/ ijmvsc.2013.4304 33

MÜSİAD (2010). Türkiye'nin Tarımsal Gücü ve Geleceği.

Neven, D. (2014). Developing sustainable food value chains - Guiding Principles, Food and Agriculture Organization of the United Nations, Rome.

OECD (2011). Evaluation of Agricultural Policy Reforms in Turkey, OECD Publishing. http://dx.doi.org/10.1787/9789264113220-en (Erişim tarihi: 27.12.2020).

Pesce M., Kırova M., Soma K., Bogaardt, M.-J., Poppe, K., Thurston, C., Monfort Belles, C., Wolfert, S., Beers, G., Urdu, D. (2019), "Research for AGRI Committee – Impacts of the digital economy on the food-chain and the CAP," European Parliament, Policy Department for Structural and Cohesion Policies, Brussels.

OECD (2016). Agricultural Policy Monitoring and Evaluation 2016. http://www.keepeek.com/Digital-Asset-Management/oecd/agriculture-and-food/agricultural-policy -monitoring-and-evaluation-2016_agr_pol-2016-en#page126 (Erişim tarihi: 27.12.2020).

TIM (2016). Türkiye İhracatçılar Meclisi: Tarım Raporu.

TOBB (2013). Türkiye Tarım Sektörü Raporu.

Tümen, S. Özertan, G. (2020). Katma Değerin Artırılması, İnovasyon Ve Dijital Tarım. TUSİAD 2020 Tarım Raporu. Yayın No: TÜSİAD-T/2020-03/615. Ankara.

TÜSİAD (2016). Yapısal Sorunlar Perspektifinden Gıda Enflasyonu. TÜSİAD, 09-578.

TC. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı (2019). On_Bırıncı_Kalkınma-Planı_2019-2023.pdf (sbb.gov.tr)

T.C. Kalkınma Bakanlığı (2014). Uluslararası Ekonomik Göstergeler

Verbeek, A., Fackelmann, S., Mcdonagh, B. (2019), "Feeding future generations: How finance can boost innovation in agri-food," European Investment Bank.

2016 Süt Raporu. (2019). (s. 56). İstanbul: Ulusal Süt Konseyi.