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INTERNATIONAL TRADE AND FINANCE**

**MASTER THESIS**

**THE IMPACT OF AGRICULTURAL SECTOR ON THE DEVELOPMENT  
OF TURKISH ECONOMY**

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## **STATEMENT OF NON-PLAGIARISM**

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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## **ABSTRACT**

### **IMPACT OF AGRICULTURAL SECTOR ON THE DEVELOPMENT OF TURKISH ECONOMY**

**GÜVENDİ, Mehmet Doğa**

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The purpose of this thesis is to analyze the policies which were pursued in Turkish agricultural sector and explore the ways to maximize its export potential. Firstly, a research has been conducted about why agricultural domain has slowed down in Turkey. Then, an analysis has been conducted in the next chapter concerning recovery of the agriculture. This thesis has been written by collating 107 articles and 20 official sources throughout 10 months. Agriculture is really a crucial sector for almost each nation in the world for it contributes to their economic growth. Particularly, agriculture is a segment which economically takes on a crucial role on the expansion and growth of Turkey. Turkey is a fecund country in terms of agricultural activities. It is more dominant than a lot of other nations in this domain due to fertility of her agricultural lands. It is one of the foremost countries that could take advantage of this sector to generate huge benefits from international trade activities. It has plenty of opportunities to boost its exports in the agricultural sector. However, Turkey has undergone a vast recession in the agricultural sphere in recent years due to wrong

agricultural policies. It has begun to import these products from abroad instead of exporting them. Especially, fundamental agricultural inputs such as seeds, fertilizers and pesticides have started to be imported from abroad. These policies have adversely affected the trade balance, gross domestic product (GDP) and consumer price index. Although Turkey has made progress in some segments of the agriculture, it hasn't been able to achieve an overall growth.

This inefficiency increases current deficit in the agricultural sector. As a result, Turkey urgently needs radical changes and reforms to make agricultural sector more profitable again and minimize its trade deficit. Ministry of Agriculture and Forestry needs to decide what is to be planned and amount of subsidy that will be given to farmers one year in advance. Findings have denoted that 8,18% of GDP affected import and export amounts of agricultural products toward development of Turkish economy as part of empirical study in my dissertation. In addition, modern and organic agricultural practices should be carried out in order to contribute to revitalization of the agrarian sphere.

**Keywords:** Agriculture, Agricultural Segment, Turkey, Economy, Reform, Agricultural Policy

## ÖZET

### TARIM SEKTÖRÜNÜN TÜRKİYE EKONOMİSİNİN KALKINMASI ÜZERİNDE ETKİSİ

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Bu tezin amacı Türkiye'nin tarım sektöründe izlenen politikaları analiz etmek ve ve potansiyeli artırmak için yollar keşfetmektir. İlk olarak tarım sektörünün gelişiminin Türkiye'de neden durduğunu ve geriye gittiğine yönelik bir araştırma yapılmıştır. Sonra, çalışmanın diğer bölümünde tarımın yeniden canlandırılmasıyla ilgili bir analiz yapılmıştır. Bu tez 107 makale ve 20 resmi kaynak derleyerek 10 ay boyunca kapsamlı araştırmaların sonucunda yazılmıştır. Tarım hemen hemen her ülke için gerçekten ekonomik büyümeye katkı yapan önemli bir sektördür. Bihassa, tarım ülkemizin ekonomik olarak kalkınması ve büyümesi üzerinde önemli bir rol oynayan sektördür. Türkiye tarım faaliyetleri açısından verimli bir ülkedir. Bu alanda tarım arazilerin verimliliğinden dolayı bir çok diğer ülkeden daha üstündür. Uluslararası ticaret faaliyetlerinden devasa gelirler elde etmek için bu kesimin üstünlüğünü elde edebilecek ülkelerin başında gelmektedir. Türkiye tarım sektöründe ihracat miktarını artırmak için çok fazla fırsata sahiptir. Ancak, son yıllar da yanlış tarım

politikalarından dolayı tarım sektöründe büyük bir gerilemeyle karşı karşıya kalmıştır. Tarım ürünlerini ihraç etmek yerine yurtdışından ithal etmeye başlamıştır. Özellikle, temel tarım girdileri olan tohumlar, gübreler ve ilaçlar ithal edilmeye başlamıştır. Bu politikalar da ticaret dengesini, gayri safi yurt içi hasılayı ve tüketici fiyat endeksini olumsuz derece de etkilemiştir. Bu da ülke ekonomisinde büyük bir zararı ortaya koymuştur. İthalat dışında, ihracat, gayri safi yurtiçi hasıla ve tüketici fiyat endeksi yanlış tarım politikaları sonucunda olumsuz şekilde etkilenmiştir. Türkiye tarım sektörünün bazı kesimlerinde ilerleme kaydetmesine rağmen, tam büyüme gerçekleştirememiştir.

Bu verimsizlik tarım kesiminin de cari açığı yükseltmektedir. Sonuç olarak, cari açığı minimize etmek ve tarım kesimini karlı hale getirebilmek için Türkiye'nin acilen köklü değişikliklere ve reformlara ihtiyacı vardır. Tarım ve Orman Bakanlığı araziye neyin ekileceğinin planlamasını yapmalıdır, çiftçiye verilecek sübvansiyonun miktarını da bir yıl önceden karar vermesi gerekir. Tezimin ampirik çalışması kapsamında, gayri safi yurtiçi hasılanın %8,18'i Türkiye ekonomisinin gelişimine yönelik tarım ürünlerinin ithalat ve ihracat miktarlarını etkilemiştir. Ek olarak, ziraat sektörünün canlanmasına katkıda bulunmak için modern ve organik tarım uygulamaları da yürütülmelidir çünkü tarım gerçekten Türkiye'nin ekonomik kalkınması için gereklidir.

**Anahtar Kelimeler:** Tarım, Tarım Sektörü, Türkiye, Ekonomi, Reform, Tarım Politikası

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## TABLE OF CONTENTS

STATEMENT OF NON-PLAGIARISM.....	iii
ABSTRACT.....	iv
ÖZET.....	vi
ACKNOWLEDGEMENTS.....	viii
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
LIST OF ABBREVIATIONS.....	xi

## CHAPTERS

<b>INTRODUCTION.....</b>	<b>1</b>
<b>CHAPTER ONE.....</b>	<b>3</b>
<b>1. THE DECELERATIONS IN AGRICULTURAL ABUNDANCE OF TURKEY.....</b>	<b>3</b>
1.1. History of Agriculture in Turkey.....	3
1.1.1. Marshall Plan.....	5
1.2. Expansion of the Agricultural Sector in Turkey.....	6
1.2.1. Agricultural Development.....	7
1.2.2. Agricultural Extension Development Projects.....	7
1.3. Recession in the Agricultural Sector.....	9
1.3.1. 24th January Decisions.....	9
1.3.2. Modern Agricultural Mechanization.....	10
1.3.3. Wrong Agricultural Policies.....	12
1.4. Errors Made in the Fertilizer Utilization.....	13
1.4.1. Chemical Fertilizer Utilization.....	14

1.4.2.	Nitrogenous Fertilizer Utilization.....	16
1.4.3.	Pesticide Use in the Agricultural Fields of Turkey.....	16
1.5.	Decline in the Amount of Agricultural Estates.....	20
1.6.	Reduction of Agricultural Support in Turkey.....	23
1.7.	Agricultural Trade.....	34
1.8.	Urban Immigration and Rural Population.....	37
1.9.	Agricultural Irrigation.....	40
<b>CHAPTER TWO.....</b>		<b>43</b>
<b>2.REVITALIZATION OF AGRICULTURAL SECTOR IN TURKEY.....</b>		<b>43</b>
2.1.	Contributions of Agricultural Segment to Economics.....	43
2.1.1.	Position and Significance of Agricultural Segment In Turkish Economy.....	44
2.2.	Sustainable and Good Agricultural Practices in Turkey.....	46
2.3.	Financing Agriculture in Turkey.....	49
2.3.1.	Agricultural Credits in Turkey.....	50
2.3.2.	Diffusion of Agricultural Cooperatives.....	51
2.3.2.1.	Agricultural Development Cooperatives.....	53
2.3.2.2.	Agricultural Credit Cooperatives.....	54
2.3.2.3.	Agricultural Sales Cooperatives.....	55
2.4.	Modern Agriculture.....	55
2.5.	Organic Agriculture.....	56
2.5.1.	Dispersion of Organic Agriculture in Turkey.....	58
2.5.2.	Organic Fertilizer.....	62
2.6.	South Eastern Anatolian Project.....	62
2.7.	Utilization of the Domestic Seed in Agricultural Estates.....	65

<b>CHAPTER THREE.....</b>	<b>66</b>
<b>3. LITERATURE REVIEW.....</b>	<b>66</b>
<b>CHAPTER FOUR.....</b>	<b>72</b>
<b>4. An Empirical Study Toward Impacts Of Agricultural Sphere On Turkish Economy.....</b>	<b>72</b>
4.1. Intention of Research and its Significance.....	72
4.2. Implementation Justification of the Research.....	72
4.3. Model of the Research.....	72
4.4. Scope of Research and Limits.....	73
4.5. Used Data in Research.....	73
4.6. Research in Hypothesis.....	73
4.7. Research Method.....	74
4.7.1. Panel Data Analysis.....	74
4.7.1.1. Strong and Weak Attributes of Panel Data Analysis.....	75
4.8. Findings.....	78
4.8.1. Import Levels of Agricultural Sphere.....	78
4.9. Unit Root Test Analysis.....	81
<b>CONCLUSION.....</b>	<b>88</b>
<b>REFERENCES.....</b>	<b>91</b>

## LIST OF TABLES

<b>Table 1:</b> Agricultural Lands in Turkey.....	28
<b>Table 2.</b> Registered Farmhand Number and Field.....	30
<b>Table 3:</b> Cultivation Areas of Some Plants.....	32
<b>Table 4:</b> Production Amounts of Some Plants.....	33
<b>Table 5:</b> Agrarian Foreign Trade.....	35
<b>Table 6:</b> Good Agricultural Practices in Turkey.....	47
<b>Table 7:</b> Organic Crop Production.....	61
<b>Table 8:</b> Selected Studies As part of Literature Review.....	66
<b>Table 9:</b> ADF Stagnation Test with Level Values of Data.....	81
<b>Table 10:</b> ADF Stagnation Test with Primary Interval Values of Data.....	82
<b>Table 11:</b> Impact Analysis of GDP.....	82
<b>Table 12:</b> Impact Analysis of Consumer Price Index.....	83
<b>Table 13:</b> Impact Analysis of Import.....	83
<b>Table 14:</b> Impact Analysis of Export.....	84
<b>Table 15:</b> Analysis of Lag Length.....	85
<b>Table 16:</b> Granger Causality Analysis.....	85

## LIST OF FIGURES

<b>Figure 1:</b> Pesticides Use (Total) In Turkey.....	18
<b>Figure 2:</b> Pesticides Trade In Turkey.....	19
<b>Figure 3:</b> Agricultural Land – Share in Land.....	22
<b>Figure 4:</b> Agricultural Support in Turkey, Producer Support (PSE).....	24
<b>Figure 5:</b> Fertilizer Consumption (% of fertilizer production).....	25
<b>Figure 6:</b> Fertilizers Manufactured of Turkey.....	26
<b>Figure 7:</b> Organic Fertilizer of Turkey.....	27
<b>Figure 8:</b> Employment in Agriculture of Turkey.....	29
<b>Figure 9:</b> Crop Production (Wheat, Tonnes/Hectare).....	31
<b>Figure 10:</b> Import-Export of Total Cereals of Turkey.....	36
<b>Figure 11:</b> Rural Population of Turkey.....	38
<b>Figure 12:</b> Rural and Urban Population 2017.....	39
<b>Figure 13:</b> Agricultural Area Irrigated – Share in Agricultural Land.....	42
<b>Figure 14:</b> Permanent Cropland (% land area).....	48
<b>Figure 15:</b> Model of the Research.....	72
<b>Figure 16:</b> Import Levels of Agricultural Sphere.....	78
<b>Figure 17:</b> Export Levels of Agricultural Segment.....	79
<b>Figure 18:</b> Overall Import Level of Turkey.....	79
<b>Figure 19:</b> Overall Export Level of Turkey.....	80

## LIST OF ABBREVIATIONS

ABTR	Agricultural Bank of Turkish Republic
AEAO	Association of Ecological Agriculture Organization
AEDP	Agricultural Extension Development Project
AEPRP	Agricultural Extension Practiced Research Project
AR	Aegean Region
ARIP	Agricultural Reform Implementation Project
BSR	Black Sea Region
CAR	Central Anatolian Region
CPI	Consumer Price Index
DISS	Direct Income Support System
EAR	Eastern Anatolian Region
EU	European Union
FAOUN	Food and Agriculture Organization of United Nations
GBE	Government Business Enterprise
GDP	Gross Domestic Product
GNP	Gross National Product
IFOAM	International Federation of Organic Agriculture Movement
IMF	International Monetary Fund
M <sup>3</sup>	Cubic Meter
MAFRT	Ministry of Agriculture and Forestry of Republic of Turkey
MCT	Ministry of Customs and Trade
MR	Marmara Region
MP	Marshall Plan
MP	Master Plan

MR	Mediterranean Region
MT	Million Tons
OECD	Organization for Economic Cooperation and Development
RIOA	Research Institute of Organic Agriculture
SEAP	South Eastern Anatolia Project
SEAR	South Eastern Anatolian Region
SHW	State Hydraulic Works
TR	Thrace Region
TSI	Turkish Statistical Institute
WB	World Bank
WTO	World Trade Organization
US	United States
USA	United States of America

XXXXXS  
GCPS

## INTRODUCTION

Abundant Anatolian lands of Turkey have nourished all former civilizations which were founded in these lands from first epoch to recent period. It is one of rare countries which cultivates diverse agrarian crops by having four seasons because of geographical location on the earth.

Once upon a time, Turkey was a self-supporting nation which carried out the sales of commodities to overseas countries in the world. It could launch agricultural feasibilities easily. However, it has become dependent to abroad from the wrong agrarian policies that were implemented within the period. It has transmuted into a country which imported agricultural crops from the foreign nations. For that reason, our country has undergone a vast deceleration in recent periods. It has hampered the growth of Turkey as well in this sphere.

It has been revealed that agricultural segment was really substantial for economy of the country due to emergence of 2018 economic crisis. It has incurred the largest downturn in this sphere since the founding of republic. The biggest negativity is related to rise of percentage rate of agricultural crops on the inflation. Producer price index (PPI) has indicated 16,02% rise in october of 2018 according to the same month of last year. It pointed out 11,87% upturn with respect to 12-month average. Food inflation of 2018 was increased from 13% to 29,5%. This rate is far higher than expected. This rise that occurred in the producer price index impinges on consumer prices adversely. With reference to 2018 October, annual producer price index is 45,01% and consumer price index (CPI) has 25,24%.

Supply inadequacy and rise of product costs are foremost factors of price increases of agricultural crops. Number of fecund lands diminished each passing year. Owing to this reason, amount of product also reduced. The population of Turkey denotes an increment along with foreign settlers as well as natural population of

country. Exchange prices which raised due to adverse data in the economy has risen costs of the commodities.

If serious precautions don't get taken in the agrarian sphere, this segment will scale up negative impacts over the economy of country by deteriorating each passing period. At the same time, it would cause the rise of current deficit of country. Hence, this recession can turn into the stagflation. That's why urgent structural reforms are supposed to be formulated in the agrarian sector.

## **CHAPTER ONE**

### **1. THE DECELERATIONS IN AGRICULTURAL ABUNDANCE OF TURKEY**

#### **1.1. History of Agriculture in Turkey**

Turkish Republic has taken over a primitive production framework which remained from Ottoman Empire in the agrarian domain as it happened in each area. Data exposed the situation concerning the structure of agriculture precisely within this period. According to this data, population of farming was approximately 13 million people but literacy rate was 10%. 90% of population used to live in rural area of the country. They would supply their subsistence from farming. Particularly, the advancement of agriculture has begun with republic. The founder of Turkish Republic Atatürk who saw the hassle in this sector has published the first declaration about agriculture in 1923 before proclaiming the republic. This declaration encompasses reform of dime levy, regulation of tobacco farming and trade to national benefits, raising the capitals of Agricultural Bank, encouraging farmhands with more loans, importation of agricultural machine and animal improvement. Atatürk; 'basis of national economy is agriculture' has emphasized the importance of agrarian sector in Turkey. Then, Izmir economic congress has been organized by recommendation of Atatürk in those days. The topics have been negotiated about agriculture. The decisions that supported the declaration of Atatürk have been made. The rescission of regie administration, delivering drink and tobacco monopoly of foreigners to autochthonous people, abolition of dime levy, botanical cultivation and growth of animal husbandry suggestions were considered between decisions (Dernek, 2006).

Besides, steering agricultural education which was accepted as the most active instrument of rural growth and resolution of agricultural credit problem have been pondered in this congress. A practiced agricultural education, embracing the innovations by practicing for farmers and inhabitation of enlightened and well-

informed people in the rustic lands have been suggested in the rural enhancement initiatives as a missioner (Yıldız ve Yıldız, 2012).

In 1925, levy dime has been repealed in the agrarian sphere. Private property right has been adopted about the land. Moreover, some affluent groups and treasury have yielded private estates. 3,7 million decare lands have been distributed to the immigrants and farmers who didn't have a land between period 1923-1938. Swift advancements have occurred in the agrarian segment with these precautions (Dernek, 2006).

27% growth has been yielded in 1929. These evolutions were the advancements which would be counted as positive in terms of food security. As a progress was made in the food security possibilities of people, rise of farmer income has soared the accessibility of food. Store of grain and cereal stock markets have been formed during period 1923-1931. These stock markets have enabled the value and quality of products, secure transaction of tender to be determined systematically by abolishing the price gaps (Eştürk ve Ören, 2014).

Lozan Peace Treaty which was clinched in 1923 has granted the debts of Ottoman Empire to Turkish Republic. After this agreement, agriculture is the sphere which was selected within this process in order to stimulate the advancement in the country. Besides, policies that intended to boost the agrarian production have been implemented by government. Especially, developments which occurred between period 1923-1929 have revealed that the option was successful. Agricultural segment has flourished over 10% with a growth rate within this period in Turkey. This progress has saved the country from a tough circumstance. At the same time, it has affected the economy of Turkey in a positive way. During 1930s, agricultural loan, sales cooperatives and state agricultural enterprises have been set up with the purpose of fostering agrarian potentials. In 1940s, agricultural product prices have indicated the increase in the aftermath of world war II. However, government in the head of administration has sought to reduce the rise in the agricultural product prices. Also, these administrations intended to grant the lands to the farmhands who didn't have lands by enacting a grounding law in 1945 (Doğan et al., 2015).

During 1950s, agricultural workforce has begun to diffuse from rural land to urban regions. Also, land reform couldn't attain an expected accomplishment. After

1960s, policies of encouraging the agrarian feasibilities have been espoused by formulating 5-year growth plan. However, agrarian policies which were implemented by the government haven't been able to attain success even if the rise of cultivation slowly accelerated along with the formulation of development plans (Erdoğan ve Erdoğan, 2018).

Any other changes have occurred in the agricultural composition of Turkey between 1950-1960. Especially, it was a period which encompassed the increase of agrarian composition owing to machine driven farming. The infrastructure investments have been mostly considered about rise of the agricultural output (Koçtürk, 2008).

### **1.1.1. Marshall Plan**

Turkey was the nation which was chosen as an agrarian country as part of framework of Marshall Plan within period 1948-1952 when USA laid down international capitalist system. Turkey has harnessed all those aids that were received by Marshall Plan in the agricultural sector. Due to the assistances of Marshall Plan, Turkey has possessed more convenient estates in the agrarian sphere. New initiatives have been spearheaded in the agrarian segment. The construction ventures of water canals have been carried out in Konya, Manisa, Eskişehir, Aydın, Adana, Susurluk, Maraş and Çanakkale through rivers in Turkey. The construction of irrigation canals has roundly affected agricultural output of Turkey in the agrarian sector. Import of the modern agricultural instruments has seemed for growth of farming as a significant phase. Thus, output has scaled up with import of the agrarian items (Çınar, 2018).

The fundamental aim of Marshall Plan was to set up an agricultural industry instead of creating an economy that is based on industrial activities. With respect to this idea, they thrived agrarian industrialization by formulating Marshall Assistances in compliance with economic growth strategy of Turkey. \$49.7 million dollars have been allocated from Marshall Plan within 1948-1950. \$22.148 million dollars were earmarked for ministry of the agriculture. In addition, \$16.134 million dollars that were equivalent to 13.8% of the sum of \$117 million dollar assistances which were allocated between period 1949-1950. It was an aid which was apportioned to ministry

of agriculture. \$38.282 million dollars have totally been granted to agrarian segment of Turkey (Özer, 2014).

Another period which caused the changes of agricultural policies in terms of economic circumstances of Turkey is related to world war II. It contains period 1938-1946. World war II years was the period which had interferences in accordance with agricultural policies. Also, stiff statism mindset was in high level during these times. While Turkey didn't join this war, it has endured all hassles of war and war economy. Millions of people were taken under the arm. It has also impinged on production and consumption in an adverse way owing to proclaimed mobilization. Besides, this situation has prompted a substantial part of assets to be disbursed for defence in the country. New conditions which transpired in Turkey has brought the searches according to agricultural policy comprehensively (Şener, 2004).

## **1.2.Expansion of the Agricultural Sector in Turkey**

New agrarian policies which began in 1950s have accelerated the impact of capitalism to agricultural sector of Turkey. In these years, agrarian estates have been expanded along with the diffusion of mechanisation in the agricultural segment. Also, the number of estates which was irrigated previously has scaled up. In this case, a production upturn has completely been rendered in the substantial rates. A significant growth has occurred in the transportation of boosting cultivation to markets with the development of highway activities (Özkan, 2016).

Fertility changes haven't been scrutinized as short-term in the agrarian domain of Turkey in 1960s. When it was examined in terms of long-term as of 1960s, there was commonly a positive trend. Mechanization, modern techniques and pesticides which began to be used in the agriculture have really been dispersed from 1960s to nowadays. Hence, the rise of abundance has detected (Balkanlı, 2002).

As of 1963, when Turkey switched to the planned economy, small meta manufacturing which denoted the agricultural cultivator in the rural land has reinvigorated owing to the support of government for intensive production. Chemical fertilizer, agricultural pesticide, usage of improved seeds and price subsidiary of government have utterly maximized the agrarian fecundity. Furthermore, government has bolstered some feasibilities about this issue such as supporting the production of

some commodities, delivering the support of product purchase with agrarian unions, identifying base-price and supplying affordable credits. At the same time, it has ensured purchasing the crop of grower. By the time it was determinative about the defrayment of cost prices of sale price in favor of cultivators, it has safeguarded the ascendancy of small meta manufacturer in the agriculture (Özkan, 2016).

### **1.2.1.Agricultural Development**

Agricultural development can be defined with the goal of ensuring the agricultural policy objectivity and boosting agrarian cultivation. At the same time, it subsumes the research and consequences of modern and scientific study technologies that producers can use in accordance with the adaptation of forms (Çınar ve Armağan, 2009).

### **1.2.2.Agricultural Extension Development Projects**

Agricultural extension activities are commonly perpetuated in Turkey throughout a long time. A lot of projects and methods have been carried out for agricultural extension services (Oymak ve Özden, 2013).

Turkey is a country which has significant experiences in the diverse extension approaches (General Extension, Training and Visit, Project, Commodity, Research of Farming Frameworks, Participant Approaches, Cost Sharing etc.). It is mostly relevant to the national, territorial, local and project level regarding agricultural extension issue (Boyacı ve Yıldız, 2014).

When agricultural extension initiatives get scrutinized in general, extension ventures get launched by establishments which have an affiliation with the ministry of agriculture and village affairs on a large scale. Producer organizations and civil society enterprises have also agrarian expansion projects as well as the ministry. However, ministry of agriculture and village affairs is undoubtedly more pervasive than other private establishments about the organizational structure, number of agricultural employment, province, county and village (Çukur ve Karaturhan, 2011).

The purpose of these ventures is to promote the agricultural extension enterprises and research institutes. Also, it always fosters the relationships between these establishments (Kızılarıslan ve akmak, 2012).

The target market is extension staff which receives duties as agricultural engineer as part of Agricultural Extension Development Project (AEDP). This campaign has been actualized by ministry of agriculture and village affairs in 1th of January 2007. The basic goal of project is to activate agricultural extension activities and directly deliver the information to rancher. When this primary aim gets ensured, it scales up the contribution of rustic area to national economy, living standards and quality of rural society. Moreover, it completely lowers the advancement intervals among the territories. It is related to the growth and protection of environment and natural reserves. It intends to reach a compatible population paradigm with a balanced and sustainable development target (ınar ve Tunalıođlu, 2013).

The endeavours have demonstrated initial agricultural extension potentials for more quality production of commodities which were exported from Turkey to overseas countries. Different initiatives have been spearheaded within diverse periods in order to streamline agrarian expansion, offering the opportunities to farmhands and modernizing the agriculture. It was significant to arrange Agrarian Congress in 1931 as part of this period. The aim of this congress was to examine the agrarian composition and instruct the farmers. Thus, extension activity has been provided for rural professors in 1937. In 1938, rural and agrarian congress has been set up. Agricultural extension was in the agenda. The organization of extension was initiated in Ankara, Manisa and Eskiřehir as of 1943. It has been complemented in all cities during 1958. It commonly encompasses the ministry of food, agriculture, livestock, village affairs, cooperatives, ministry of forestry, ministry of state, ministry of industry and trade. The units which were related to agricultural domain have been agglomerated by mobilization. Most of the agricultural extension ventures which were carried out by ministry of food, agriculture and livestock have been tried to be practiced for Instruction and Visit System. This framework has been implemented by support of World Bank in 1963. Also, it was Ařađı Seyhan Irrigation Campaign which was launched first time in the world and Turkey in Adana lowland. Henceforth, Instruction and Visit System have embarked on the initial Agricultural Extension Practiced Research Project (AEPRP-I) via credit of World Bank in 16 provinces in 1983. In

1990, Agricultural Extension Practiced Research Project (AEPRP-II) have been initiated. Furthermore, it has enabled farmhands to adopt the modern agricultural technology with these initiatives. Thus, increase of cultivation and fertility in the agriculture has intended to be boosted (Kızılaslan ve Çakmak, 2012).

### **1.3.Recession in the Agricultural Sector**

Agriculture was the segment which manifested some dimensions concerning the cornerstone of Turkish Economy till 1980s. However, agrarian sphere has begun to decelerate due to the impact of rapid revival of industrial, service and construction domains. Another motive of this downswing has originated from the transition to free market economy. Moreover, liberalization which was dependent to the abroad had also a wide effect after 1980 (Doğan et al., 2015).

Particularly, agrarian support policies have been formulated concerning the output feasibilities in order to carry on the administrations of governments properly as of 1980. For this reason, structural problems have begun to be more profound in the agricultural segment of country (Öztürk et al., 2008).

When contribution of Gross Domestic Product (GDP) was 26% in 1980s, this rate has reduced 8,5% in 2013. As for export rate, Gross Domestic Product has had a 57% contribution in 1980s. However, this rate has diminished 10% in 2013. When it had a 62.5% in the employment rate during 1980s, it has scaled down till 26% in 2013 (Doğan et al., 2015).

#### **1.3.1.24th January Decisions**

The validity of stable program was a milestone in terms of Turkish economy in 24th of January 1980 (Durak ve Karadağ, 2017). The decisions which were made regarding neoliberal economic policies during 24 January 1980 in Turkey have impinged on the state economic enterprises, private businesses and agrarian producers adversely. State institutions and small cultivators which are relevant to agriculture haven't been able to compete against large national and transnational firms in the free market. Thus, it has caused a lot of changes about agrarian sphere of Turkey. The competition which was brought by liberal market framework revealed that public

institutions weren't gainful concerning the agriculture. Also, it has contributed to the privatization. For that reason, small producers and other weak cultivators have confronted with the hazard of losing their lands (Özkan, 2016).

Agricultural sphere has been ruled by interventions of government with a viable policy till the transition years from planned period to liberal economy. Methods that are like base and ceiling price practices have appeared in the forefront. After transition to liberal economy, agricultural sector has been influenced from this political approach in a negative way. Therefore, number of agricultural supports was quantitatively diminished. In 1980s, inflation rate of the agrarian segment has begun to be assessed among the foremost reasons (Doğan et al., 2018).

Especially, a set of precautions have been predicted for the reduction of inflation rate so agricultural sector has generally been affected from these precautions in Turkey. Also, provision which means 'Liquid fuel, based prices of agrarian crops and GBE (Government Business Enterprise) prices will be regulated in accordance with the way of impeding inflation rate.' comprises codes of the policies which will be pursued after that. It implies that agricultural sphere will mostly be influenced because subsidies which were raised for agricultural inputs have prompted the prices of agrarian crops to be low. In addition, it has caused low interest agricultural loans to face high inflation rate. If existence of high inflation gets considered in Turkish economy, prices which are identified earlier than the cultivation of agricultural products remain prevalently under the high inflation. Therefore, rancher who was in the cultivator position has undergone a damage. At the same time, it has led to the slump of agrarian output in the economy of country (Öztürk et al., 2008).

### **1.3.2. Modern Agricultural Mechanization**

Agricultural mechanization which is indispensable input of modern agriculture entails a tough planning owing to pricey and long-term investments. Agricultural mechanization subsumes those; flourishing agrarian lands, launching each type of agrarian output, the whole energy asset, design, evolution, marketing, extension of mechanical instruments which get used in the manufacturing with the intention of carrying out the operations of commodities. For this reason, problems and situations

of agricultural mechanization should be accentuated in terms of the territorial (Gökdoğan, 2012).

Mechanization level has pointed out a swift change in Turkey between 1965-1975. After a broad rise in 1975 at 171% rate, it has reduced. When it was 63% in 1985, it has dwindled 12% in 1998. Large problems have ensued in all business domains concerning the agricultural machines with these declines. Nowadays, these issues continue in our country. Even though Turkey is a country which has a convenient structure with land, water resources and geographical location in terms of agricultural output, it endures some technological, economic and natural encumbrances in the agrarian production. Turkey is a nation which confronts with renovation problems of the equipment pool within economic continuum, rise of outlays and operating issues of available machines despite advancement of the agricultural machineries. In other words, a downturn has been observed in the number of total enterprise and agricultural area between period 1981-2001 in Turkey. Total enterprise has undergone 20,73% downswing. As for rural land, it has incurred 22,70% loss (Altuntaş et al., 2004).

Agricultural enterprises have multiple limited lands in the conditions of Turkey. They don't have plenty of capital to purchase a new farm machine. Moreover, these enterprises don't have sufficient technical knowledge and instruction for the utilization of machine, inadequate atelier equipment in order to carry out the repairment and routine maintenance of machine. That's why it is very tough to purchase pricey machine which has a convoluted structure for agrarian establishments (Yıldız et all, 2003).

Low values of the agricultural mechanization level arise from less efficiency of machine utilization in Turkey. At the same time, it scales down the productivity of tractor, tools and machine utilization owing to parcels of the agrarian fields and low value of average operating land. Furthermore, determinants of low operating field and high agrarian population lead to decrease of per capita agricultural income. It declines the tractor and equipment demand of farmhands. More than 25% of indigenous population in Turkey work in the agrarian segment. It impinges on the agricultural mechanization properties negatively with a low income share (Bilim etc all, 2014).

### **1.3.3. Wrong Agricultural Policies**

Planning period has been initiated as of 1963 in the determination of agrarian policies. As intervention of government was directive and supportive in the agricultural sector during the first years about basic principles of the development plans, policy of supporting the price has been accentuated in the subsequent planning periods. The need of industrialization policies has been considered through import substitution method which was led from 1960 till 1980. The rise of agricultural output and fertility have become first goal of agrarian policies (Eştürk ve Ören, 2014).

International capital mobility has pointed out an upturn step by step in Turkey after 1980. Expected growth hasn't been able to take place with proper policies toward the end of 1990s in the agricultural sector. After this period, long-term and structural changes have been actualized in the policies of encouraging agrarian sphere (Terin et al., 2013).

Agricultural sphere has commonly been sought to be led by short-term political conjecture index price in Turkey. It hasn't generally subsumed the structural precautions till 2000. The extent of support and price levels have mostly been pinpointed by political dismays as well as economic determinants. Also, they aren't associated with developments in the internal and external demand. However, budget burden which was upheld by these policies concerning public resources has uncovered inequality in the income distribution, inadequacy of formulated policies, impediment of reaching the support to target mass and insusceptibility against market conditions. Furthermore, these policies have brought the changing territorial, transnational conditions and different approaches in the agrarian segment, reform requirement, priority of political options about price decisions and commitments which emanated from partial agreements (Yılmaz et al., 2006).

Radical changes that were carried out in the agricultural policies were based on the external determinants as well as internal motives. It has commonly stemmed from the responsibilities encompassing agreements which were clinched by European Union (EU) and World Trade Organization (WTO) (Durak ve Karadağ, 2017).

In 2000s, agrarian policies have incurred radical changes in Turkey with the treaties which were ratified by International Monetary fund (IMF). Available support policies which needed to be formulated within the continuum have been deterred.

Direct Income Support System (DISS) which was suggested by World Bank has bolstered small grower. In addition, the prices of cereal, sugar beet and tobacco have been brought to a congruous situation with the world prices. However, it was related to the abrogation of support within the period (Erdoğan ve Erdoğan, 2018).

#### **1.4.Errors Made in the Fertilizer Utilization**

Fertilizer production and consumption is one of the best indicators of amount of product which is received from unit area as well as agrarian expansion of a country. Fertilizing is the most significant determinant which lowers dependency to the natural conditions of agricultural cultivation along with irrigation (Polat et al., 2013).

Fertilizer utilization has raised in the agricultural cultivation in order to meet the needs of rising population and demand of industry to the raw material in thriving industry. Utilization of synthetic manure has maximized the agrarian fecundity and reduced food prices. Furthermore, upturn in the export of agricultural crops and positive impact on the economy of country has been reckoned. However, damage of this type of manure to environment has been denied by functionaries and soil cultivators. For that reason, parallel pollution has boosted about manure use in the agricultural estates and catchment basins (Doğantürk ve Gürlek, 2018).

Unconsciousness has become one of chronic problems of Turkish agriculture in the fertilizer utilization. Manure and fertilizing problems have lack of knowledge in terms of geographical determinants in Turkey (Şahin, 2016).

As fertilizers which don't get utilized conveniently in accordance with its technique cause deceleration of botanical production, it ruins the structure of soil. At the same time, it diminishes the quality of potable water. In addition, it prompts a waste of natural resource by polluting groundwaters (Kızılay ve Akçaöz, 2009).

On the other hand, it lowers the quality of products. It connotes the utilization problem of agricultural pesticide and fertilizer. Most of the cultivators utilize manures without conducting analysis of soil. Moreover, fertilizer support which wasn't specified with reference to utilized manure due to high prices has led to inadequacy of this support. Payment of fertilizer support cannot be carried out in the time that

growers purchase. The subsidies which were raised for support has forestalled its usage in the manure purchase under desire of farmhands (Altıntaş ve Altıntaş, 2012).

An important part of growers are really delicate about the issue of increasing abundance by using the manure. On the other hand, cultivator has a practice; where, when, which manure, in which amount and how to use. It connotes one of the largest shortcomings of fertilizer utilization (Yılmaz et al., 2009).

Chemical fertilizer, plant growth regulators and agricultural pesticides have densely begun to be utilized in the beginning of 20th century in order to obtain more abundance from unit area. As fertilizing was utilized in the conventional agriculture, maximum fertility that will be yielded many times from the plants are aimed but it has been refuted that these manures would damage the environment. Even if these syntetic manures which are utilized in the extreme amounts soar quality and fertility in the plants, it causes the disruptions in the structure of soil, impairment of microorganism feasibilities and more important is that impairment of available biological balances (Özbay et al., 2018).

#### **1.4.1. Chemical Fertilizer Utilization**

Utilization fecundity of chemical fertilizer is one of the most substantial factors that identifies the output level. Fertilizer consumption has indicated a rise with impetuses and support that were formulated in Turkey but rise speed of the manure has decelerated in recent times. Utilization of chemical fertilizer is lower than many advanced and thriving countries in Turkey. Chemical manure which was used in Turkey has been ascertained as (N+P+K) 100.4 kg. to hectare. This value is 665.5 in Netherlands. Egypt has 624.8, Japan has 373.2, China has 301.5 and Indonesia has 106.9 kg/ha. This rate is 141.6 in accordance with average of European nations concerning chemical fertilizer. World average is 107.9 kg/ha. Agricultural enterprises have been disintegrated in Turkey. This shrinkage cannot streamline the possibility to the utilization of chemical fertilizers in the economic level. Imbalance appears between products and establishments along with interregional imbalances in the consumption (Yılmaz et al., 2009).

Chemical fertilizers get used in high amount in order to provide the lushness in exalted level within the agricultural practices. Efficiencies of chemical fertilizers

which are utilized in the fields remain in the limited level by depending on soil and fertilizer property. For that reason, extreme fertilizer utilization uncovers. Hence, it unearthes both decline of product quality and problems of environmental pollution (Arslan, 2016).

Chemical manure and side-effects of pesticide which were densely utilized in the field have taken environment and human health under the menace markedly with the purpose of yielding more crops from conventional agriculture throughout many years. In the agriculture, 'Green Revolution' was a mentality which intended to augment amount of yielded product from unit area. The aim was to distribute food need of raising world population as of 1960-1970. Rise of expected fecundity has been yielded in the aftermath of chemical pesticide and fertilizer utilization but adverse impacts of chemical pestiside and fertilizing utilization have begun to seem on human health within the period (Göktekin ve Ünlü, 2016).

The most common environmental problems of utilization of chemical fertilizer are the chemical pollution. Especially, this pollution generally takes place in the soil, air and water (Şahin, 2016).

Adverse impacts of chemical ferzilizers creating a substantial part of cost in the agricultural cultivation prompt salt deposit in the soil. Also, it disrupts the soil structure and its negative influence to soil Ph (Kara, 2015).

It has been predicted that fertilizer which had 10-15% allotment within costs of agricultural crops has augmented its productivity to nearly 50%. However, chemical manures which were utilized unconsciously and imbalancedly with the intention of boosting fecundity in the botanical cultivation have maximized production cost. At the same time, it threatens the human, animal and plant health by mixing into subterranean and surface waters. It is impossible to yield the expected fertility and quality product with chemical manuring by adding an insufficient fertilizing to a chemical fertilization (Demirtaş et al., 2012).

Utilization of dense chemical fertilizer disrupts natural structure and liveliness of soil. It is related to microorganizm activity. Slow regeneration of soil structure prompts the fertility losses (Özdemir ve Özer, 2016).

#### **1.4.2. Nitrogenous Fertilizer Utilization**

Utilization of nitrogenous fertilizer surpasses amount of nitrogen that is stowed in the soil and yielded by herbs in many cases. It densely gets applied in the sowing method in higher level. For this reason, nitrogen leaks under the root part of herb and causing water pollution. In case application of nitrogenous fertilizer is without minding nitrogenous amount on the soil and real need of plant, nitrate aggregation occurs in the result of extreme nitrogen which is generated by some herbs. In the various portions, nitrate levels of some plants which are purchased by people on daily basis can reach toxic level through nitrogenous fertilizers (Özenç ve Şenlikoğlu, 2017).

Nitrogenous fertilizers pollute air, soil and water as nitrate in the aftermath of human activities as precipitation, evaporation, transpiration, irrigation and nature. Especially, it uncovers the human health as well as colossal environmental devastations (Şahin, 2016).

#### **1.4.3. Pesticide Use in the Agricultural Fields of Turkey**

Pesticides have a lot of needless effects like human health, affecting the environment and natural balance, detecting remnant on the air, soil, water and products, posing disease and resistance of unknown weeds. As precautions are taken in order to render conscious usage of pesticides nowadays, diverse types of strategies are formulated with the goal of lowering its use. Problems which led to usage of pesticide in Turkey have begun to be considered. Disease and harms have soared the adverse impact to the products. It leads to low productivity in the crops (Erbek et al., 2018).

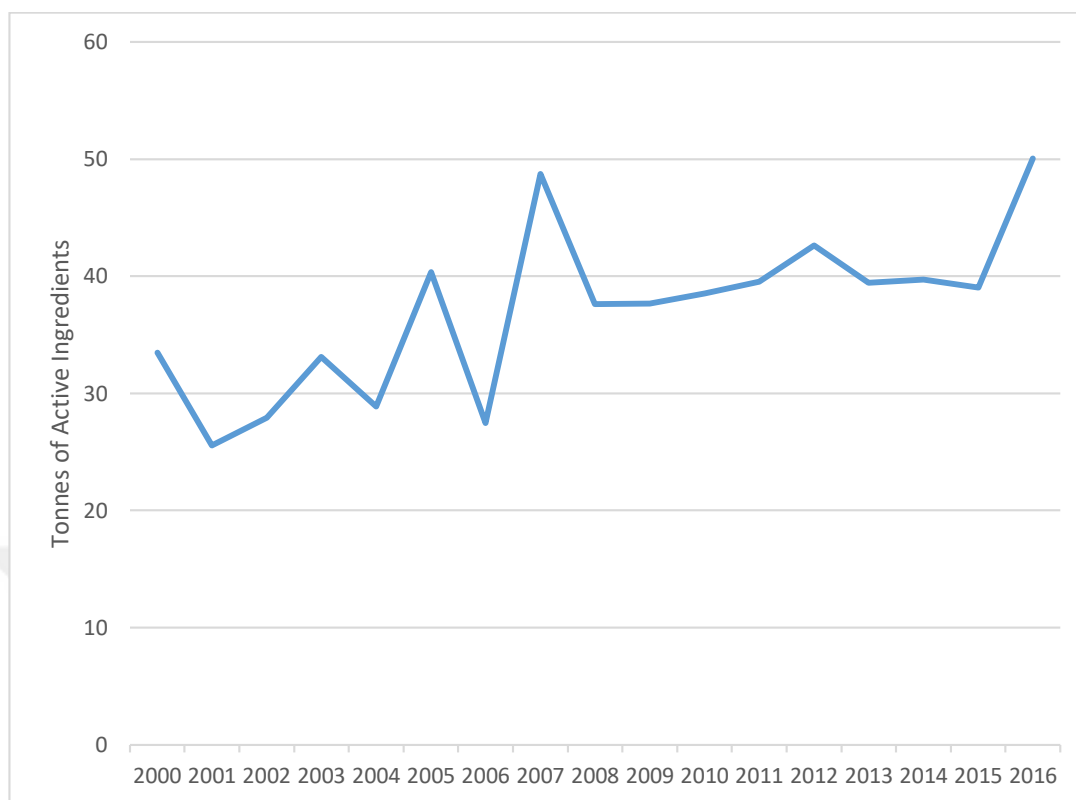
Use of farming pesticide has been commenced after world war II. Especially, it has formulated a strategy that was based on the usage of synthetic chemical fertilizer and combat pesticides for cultivation of the food substance in cheap and intense amount. When it was during 1980s, chemical substances which were utilized in the farming have begun to detect environmental problems with the disruption of ecological balance. It has been revealed that average product loss was 65% when agricultural pesticide wasn't used in the botanical production. Although agricultural pesticide was used according to the forecasts, product loss has been estimated approximately 30-35% with various justifications (Kızılaslan ve Sokmak, 2013).

Pesticide use has begun to raise in a rapid way after 1960s in Turkey. 35123 tonnes of pesticides are consumed in Turkey as an average. 40% of pesticide consumption is insecticide, 24% herbicide and 23% fungicide. It includes 7% for winter battle pesticides and winter oils, 5% nemonicide and soil fumigants. 1% belongs to plant cultivation and other pesticides. 0,63 kg pesticide gets used for hectare in Turkey as an influential substance. Pesticide consumption is in lower level approximately 7 to 28 fold as an effective substance according to major advanced countries. However, a heterogenous structure is observed in terms of pesticide usage between regions and provinces contrary to many developed nations (Kızılay ve Akçaöz, 2009).

20.4% of total agricultural pesticides are in the cotton, 19.1% cereal, 16.6% vegetable, 13.0% fruit, 7.9% vineyard, 7.0% citrus fruits, 3.1% tobacco, 2.6% legume forages and 1.1% sunflower. 6.5% of agricultural pesticides have been utilized for other crops (Demircan ve Aktaş, 2004).

Use of the agricultural pesticide augments in our country step by step. Depletion of pesticide denoted a rise with 45,29% in 2002 in accordance with 1979. However, this rise was about 9,26% between year 2002-2009. Despite this upturn, pesticide consumption rate is far lower than advanced states in Turkey. Also, consumptions of Mediterranean and Aegean Sea Territories which embark on intensive farming scopes are above the average of Turkey. Enhancement of the botanical production and formation of new lands is going to condense its usage. While less pesticides commonly get consumed in Turkey, pesticides that are mostly consumed in the fields disclose momentous risks in terms of environment and health (Altıkat et al, 2009).

**Figure 1: Pesticides Use (Total) In Turkey**



**Source:** Food and Agriculture Organization of United Nations 2019<sup>1</sup>

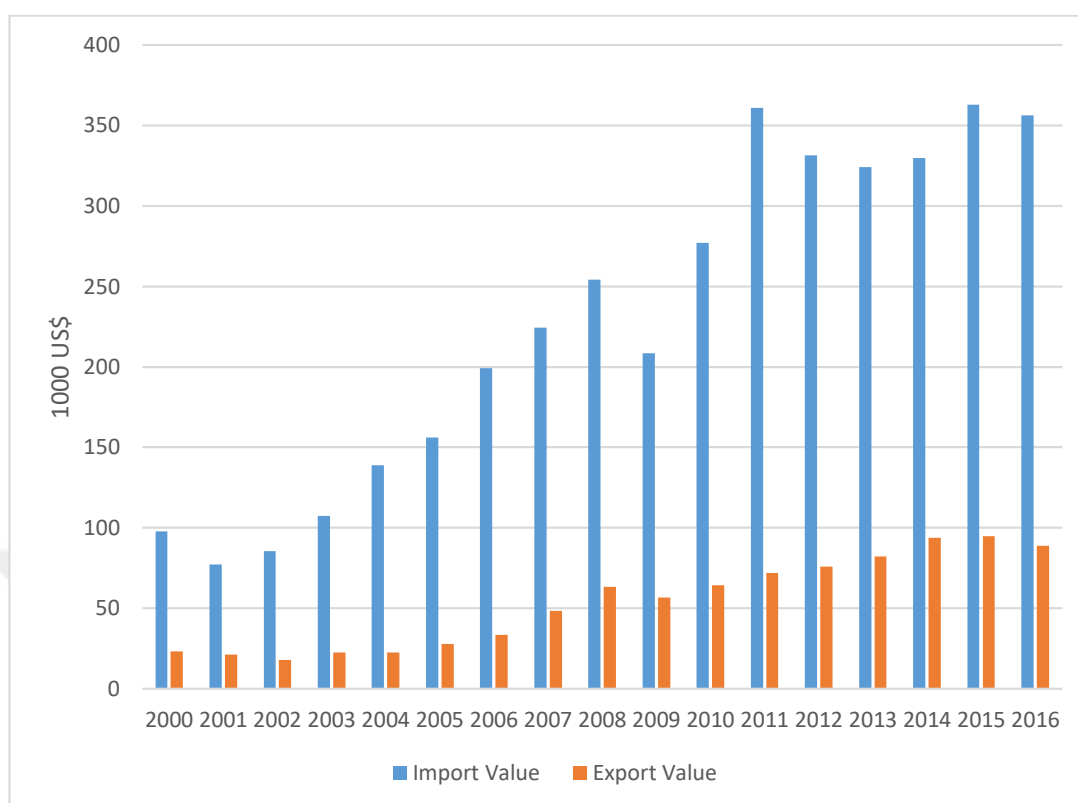
As it was pointed out above figure 1, total use of pesticide has been given about Turkey between period 2000-2016.

While pesticide use diminished in 2001, it raised in the subsequent years. Especially, amount of pesticide utilization scaled up as of 2007 in a rapid way. It is approximately 50,000 tonnes. Even if an abrupt downturn gets observed in 2008, it indicated an upturn in the use of pesticide in following period. Then, it roundly reached the climax in 2016.

Briefly, pesticides which are utilized in the agricultural fields of Turkey look pervasive. Turkey carries out import feasibility of pesticide from overseas countries in order to recover abundance of those lands, plants, fruits, vegetables and crops which are sprouted in the rural area. For this reason, amount of ton keeps maximizing each passing year. Then, it roundly reached the climax in 2016.

<sup>1</sup> <http://www.fao.org/faostat/en/#data/RP/visualize> ; accessed February 2019.

**Figure 2: Pesticides Trade In Turkey**



**Source:** Food and Agriculture Organization of United Nations 2019<sup>2</sup>

With reference to figure 2, data were indicated concerning import and export values of Turkey within period 2000-2016.

When it gets scrutinized, there is a vast interval between import and export rates of pesticides. Import value has a large ascendancy against export rate year by year. Although cost of the import value lowered in 2001 and 2002, it drastically boosted as of 2003. Even if it incurred a change in 2009, import value kept soaring in the subsequent periods swiftly. As for export rate, there is almost no a crucial progress. Despite the upswing, it is seriously inadequate. Besides, import rate has reached the pinnacle with \$362,902 in 2015.

As a consequence, it is really a dreadful number for Turkey. It settles prodigious amount of dollar in order to purchase the pesticides from foreign states. At the same time, it creates a wide current deficit in the economy of country along with costing these pesticides to a more pricey value.

<sup>2</sup> <http://www.fao.org/faostat/en/#data/RT/visualize> ; accessed February 2019.

### **1.5. Decline in the Amount of Agricultural Estates**

Public segment captures agricultural fields with expropriation purpose when it needed. Value of the agricultural lands is related to appraisal. It gets conserved between current topics in Turkey (Dağdemir et al., 2018).

Rise of population and formation of new habitation areas have caused shrinkage of the agricultural lands along with emigration movements. Also, it would prompt lands to disintegrate. Lands that need to be preserved within agricultural attribution are under the risk due to nonagricultural utilizations. Land utilizations have incurred nonagricultural use within years by detaching from agricultural output in Turkey. It continues from past to nowadays (Çolak ve Memişoğlu, 2018).

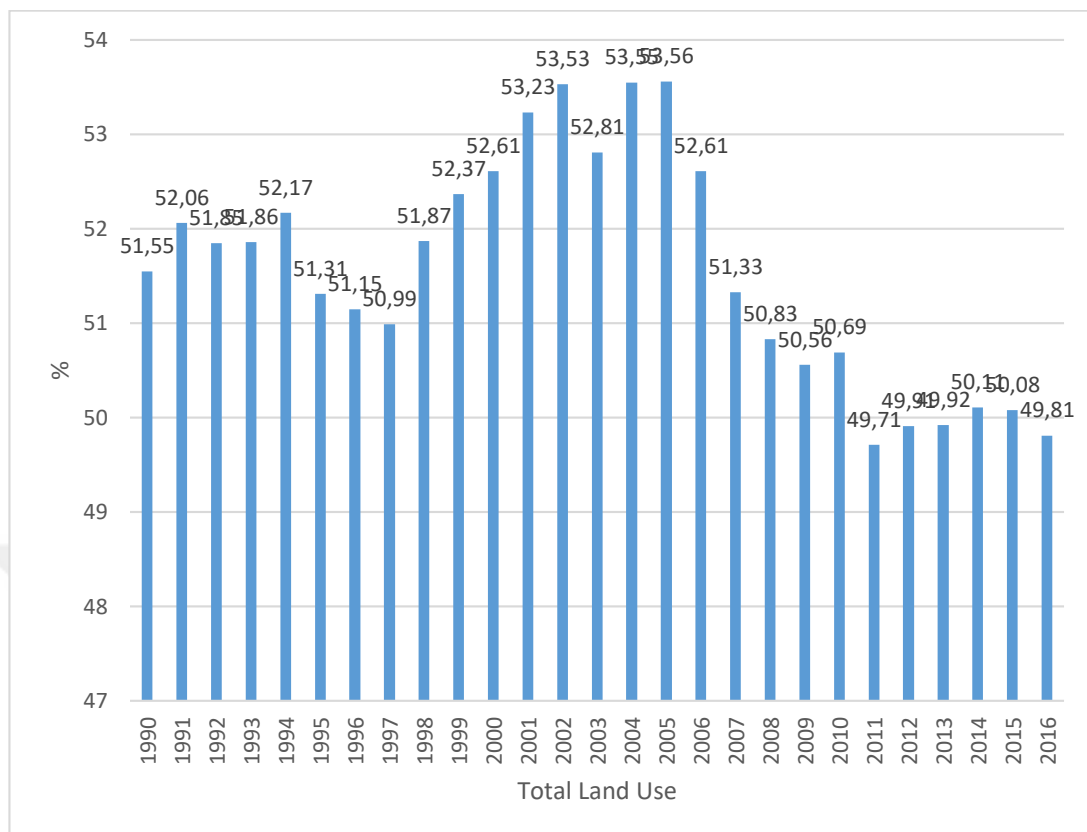
As most of the agricultural enterprises weren't adequately large-scale, farming lands have been extremely shattered. In addition, those lands have converted into nonproductive fields. A part of agricultural entities which have within capital and workforce problems cannot yield all of the lands. For that reason, these establishments operate a section through tenancy and collectivism. This situation prompts lands to be shattered in point of utilization. Amount of land which is yielded by ranchers are limited and remote from each other. Regular enterprises cannot be established owing to a vast number of parcels about formation. Therefore, it cannot ensure expected production increase with existing circumstance. Furthermore, ones that deliver a part of estates in the village by inhabiting in the cities are also an element about disintegration of the lands. Drastic economic losses occur in the ramification of disintegration of agricultural estates. Cultivators fall into disadvantageous position due to cost escalation of yielded agricultural products (Ekinci ve Sayılı, 2010).

Formlessness of the agricultural lands, road network, inadequacy of the irrigation and drainage system intercept fertile agricultural output in Turkey. While technological potentials of agricultural output and genetic applications of seed production boosted, drawbacks which stemmed from properties of the estate haven't roundly been tackled. Moreover, pesticides which were utilized toward recovery of the plant haven't forestalled this problem. Especially, sloppy and small-scaled parcels cause the cost to raise. In addition, it dwindles cultivation in the unit area (Durduran et al., 2018).

As long as number of parcel of land increases, separating more lands for parcel limits, roads and water canals cause losses of the agricultural areas to rise. Divided and sloppy lands raise output costs. At the same time, it reduces labor productivity of the agricultural equipment and machineries. Partition and dispersion of the pasture lands prompt environmental problems to boost along with similar drawbacks in the erosion of lands (Küsek, 2014).

In accordance with consequences of the agricultural calculation of 2001, 12,3 million portions of agricultural patches have been identified in Turkey. 4 portions of land averagely get shared per unit. So, it can be told that Inheritance Law Provisions, assets of irrigation and drainage canals, transportation and implementing expropriation prompt partition of the lands. Existing situation points out that there are area problems which encompass some factors regarding fecundity, land, human, endeavour and time in the rural area (Durduran et al., 2018).

**Figure 3: Agricultural Land – Share in Land**



**Source:** Food and Agricultural Organization of United Nations 2019<sup>3</sup>

With reference to figure 3, amount of total land use of Turkey has been specified in the countryside.

Rate of land use looks satisfactory within 1990-2000. While this amount scaled down 51,3% in 1995, land which was utilized in the rustic area has scaled up in the subsequent years. It has resumed its upswing till 2005. It has reached the zenith within that period. Then, a drastic downswing began as of 2006. Land use of Turkey dwindled 52,6 in the rural areas. Also, this decline continues in following years. Turkey cannot demonstrate any other metttles in order to maintain conservation of these fields. So, there is no any progress about use of the agrarian lands of Turkey.

<sup>3</sup> <http://www.fao.org/faostat/en/#data/EL/visualize> ; accessed April 2019.

## **1.6.Reduction of Agricultural Support in Turkey**

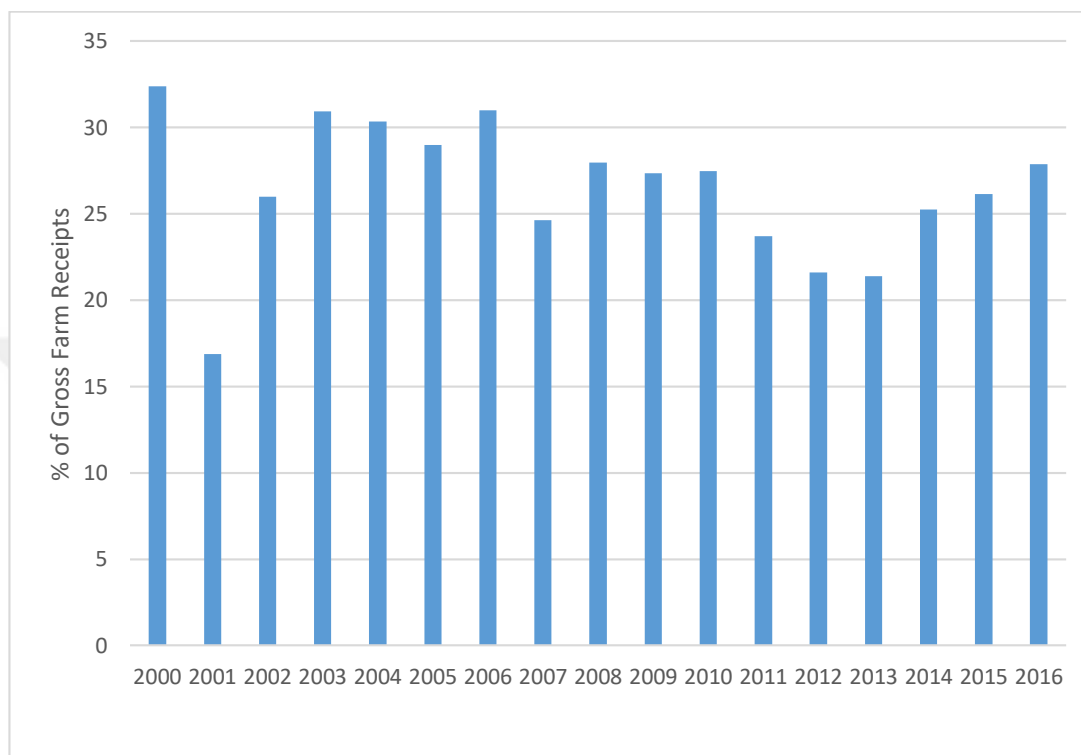
Stability hasn't been supplied in the producer income with market price support which was formulated before 2000. The practices of support purchase prices have extremely expanded plant areas of some crops. Thus, it has caused high-level cultivation in these products. This situation has led the increase of stock costs and more import of goverment from overseas countries. At the same time, budget burden has also boosted with the rise of stock cost. Agricultural subsidy policies which were implemented in the system of support purchases have been subjected to equal budget constraint of International Monetary Fund in terms of domestic policies. Also, it has undergone the hindrance of World Trade Organization on account of foreign policies (Aktaş et al., 2013).

Agrarian segment has been promoted by diverse policies in Turkey throughout many years. However, national and international conditions which switched within the period have brought different political approaches and reform requirements to agenda. Agricultural support policies which were implemented in the beginning of 2000s hasn't reflected on the target mass. Furthermore, the purposes which were identified previously couldn't be achieved. Henceforth, it has lost its effect by bringing heavy financial burden to the public assets. At the same time, it has been considered as the determinants that forestalled toward the evolution of agrarian sector (Erdal et al., 2013).

As implementation of support policies couldn't meet the expectations in Turkish agriculture in recent years, it has set off the problems in terms of economic, socio-economic, financial and international relations according to the perspectives of everyone. That's why it has pointed out that it was mandatory to implement the proper reforms in the agricultural support policies. In the aftermath of external and internal considerations within the country about reform implementation, Pilot Scheme which was actualized in 2000 has contributed to the formation of Direct Income Support System (DISS) as of 2002 in Turkey. Also, it has been seen as a saver in the agricultural support. Whereas, Direct Income Support System has been abrogated as of 2006. It has denoted that Direct Income Support System needed these determinants in terms of goals, borders, assets, resources, administration etc. perfectly in order to satisfy the expectations. Particularly, who will become target groups or factors and what will happen in the future. Such as time of practice, budget and its circumstance on account

of burden of taxpayers, convenience of this method to the agricultural structure. All these criteria were supposed to be pinpointed flawlessly (Ağırbaş, 2016).

**Figure 4:** Agricultural Support in Turkey, Producer Support (PSE)



**Source:** Organization for Economic Cooperation and Development 2018<sup>4</sup>

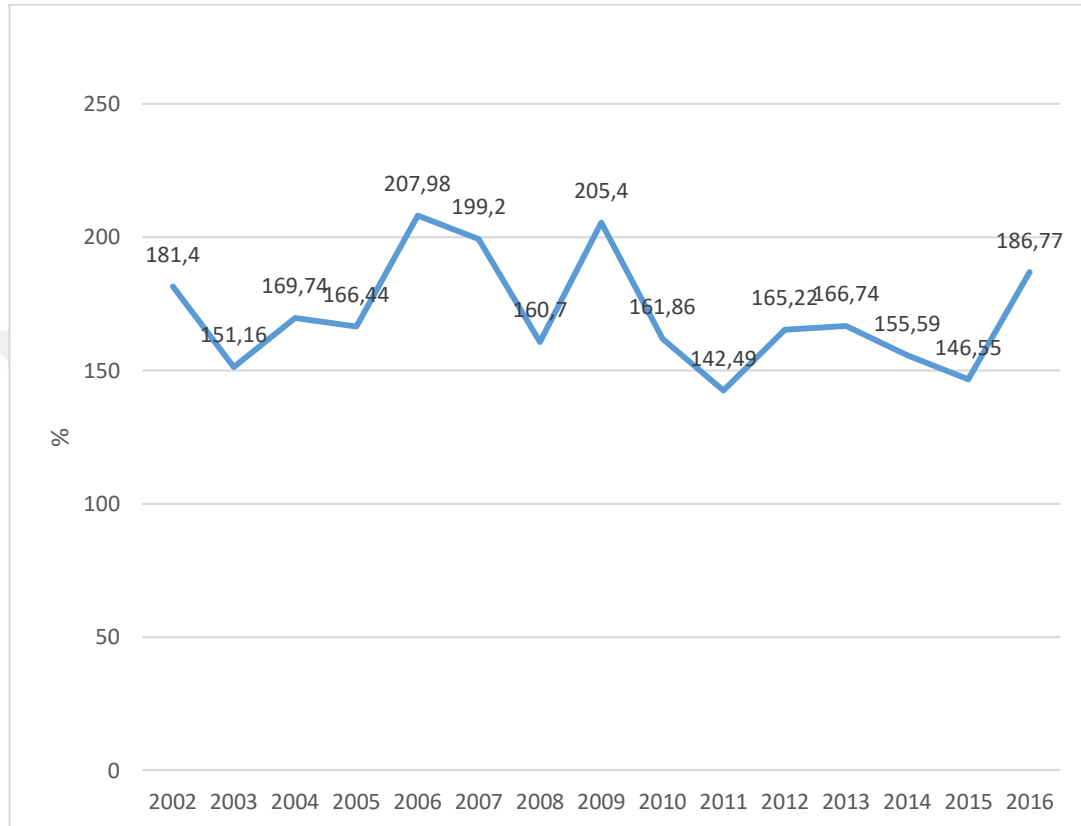
In accordance with figure 4, agricultural support of Turkey has been shown with percentage rate of gross farm receipts from 2000 to 2016.

Agricultural support has the highest rate in 2000 but there is a vast downturn which ensued as of 2001. Even if an upturn gets observed till year 2006, decline continues in following years. It reveals that it isn't adequate to perpetuate the agricultural support of Turkey with these circumstances. Unfortunately, there is no a conspicuous stability about agricultural support of the country. Moreover, each commodity is imported from overseas countries. The costs of agricultural instruments are also high. That's why farmers cannot work proactively in the rural area. Thus,

<sup>4</sup> <https://data.oecd.org/agrpolicy/agricultural-support.htm> ; accessed October 2018.

ranchers cannot carry out the sales of agrarian products which are propagated in rural estates.

**Figure 5:** Fertilizer Consumption (% of fertilizer production)



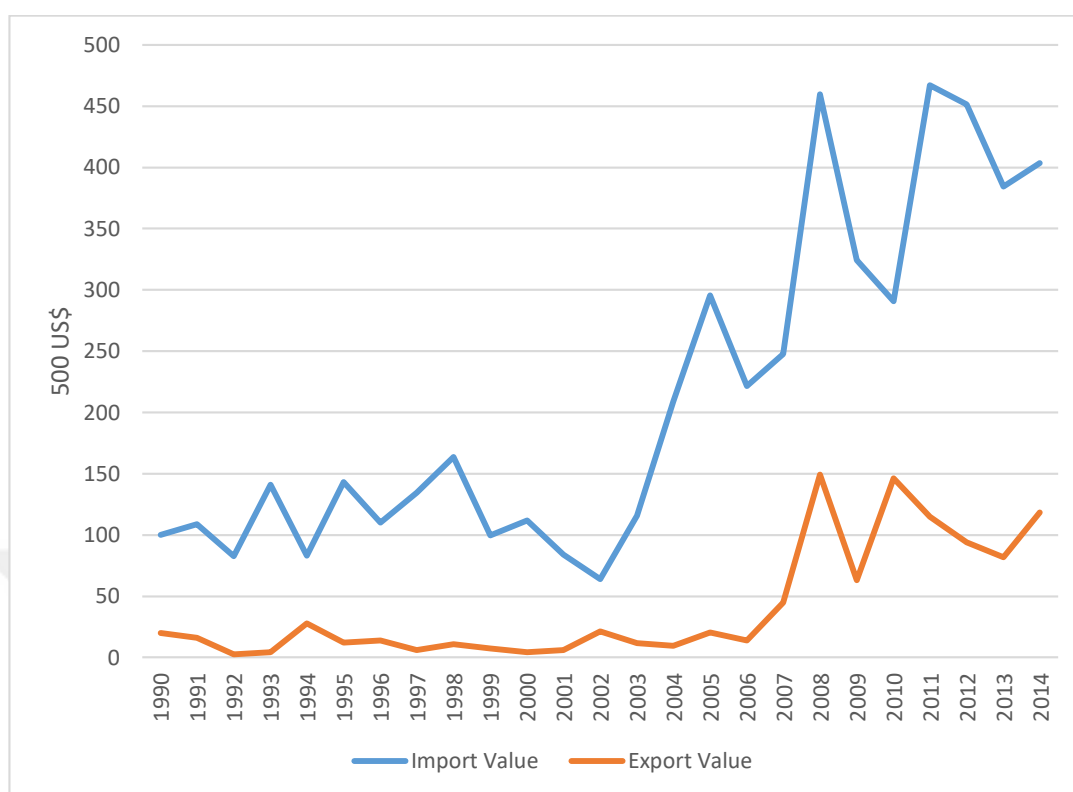
**Source:** World Bank Open Data<sup>5</sup>

As it was manifested on the figure 5, fertilizer consumption of Turkey was given from fertilizer production between period 2002-2016.

In 2002, fertilizer consumption rate is 181,4%. However, an abrupt slump occurred in 2003. It is at the climax in 2006 from the fertilizer output. While it denoted an upturn till 205,4% in 2009, it briskly kept reducing in the subsequent years. So, a colossal instability is observed concerning fertilizer consumption of Turkey. Besides, there is a large imbalance in these rates year by year.

<sup>5</sup> <https://data.worldbank.org/indicator/AG.CON.FERT.PT.ZS?locations=TR&view=chart> ; accessed December 2018.

**Figure 6:** Fertilizers Manufactured of Turkey



**Source:** Food and Agriculture Organization of United Nations<sup>6</sup>

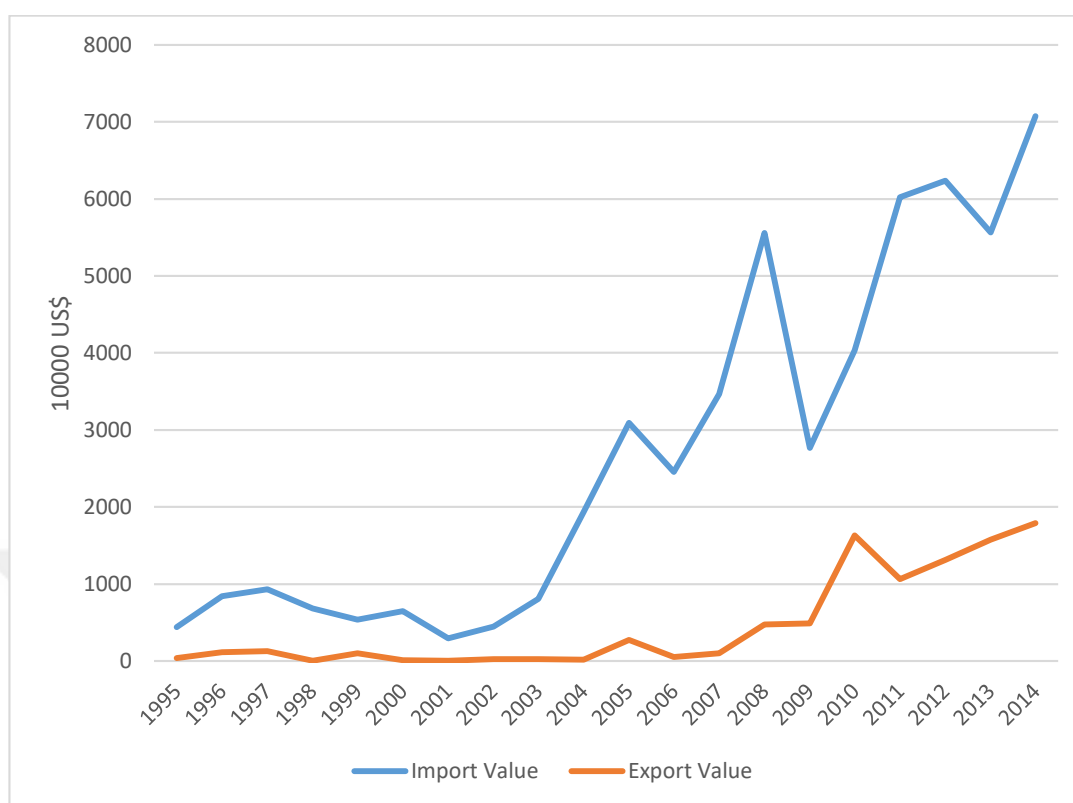
In accordance with figure 6, import-export values were pointed out about fertilizer manufacturing of Turkey.

Import value has a wide supremacy against export value in each year. Import rate of fertilizer manufacturing has specified an upturn after 1996. Even if import rate had some declines and rises during 2000s, it kept maximizing abruptly as of 2002. Unfortunately, there is no a stable upswing in the export rate of fertilizer manufacturing of the country. While import value had a downswing in 2006, it resumed its rise in following periods. Especially, it is at the climax in 2008 and 2011.

Hence, Turkey costs with gigantic amount of dollars from the abroad. It cannot sustain fertilizer manufacturing activities stably. At the same time, it prompts a substantial current deficit for Turkey.

<sup>6</sup> <http://www.fao.org/faostat/en/#data/RV/visualize> ; accessed December 2018.

**Figure 7: Organic Fertilizer of Turkey**



**Source:** Food and Agriculture Organization of United Nations<sup>7</sup>

As it was pointed out in figure 7, import-export values were given regarding the organic fertilizer of Turkey.

Import value has a large ascendancy in accordance with export value in each period. Although the cost of import is less than 1000\$, it soared swiftly after 2003. Even if it had a downswing in 2006 and 2009, import value was costed to a colossal amount in the subsequent years. Also, there is no a steady rise in the export value of organic fertilizer. Even though Turkey boosted export value of the organic fertilizer by 2008, this number looks far lower than import value.

As a consequence, Turkey has a current deficit about the production of organic fertilizer. There is no a profitability in the organic fertilizer manufacturing, it costs them to a vast amount from overseas countries.

<sup>7</sup> <http://www.fao.org/faostat/en/#data/RV/visualize> ; accessed December 2018.

**Table 1: Agricultural Lands in Turkey**

Year	1990		2002		2014		2015		2016		2017	
	Tho. Hec.	%	Tho. Hec.	%	Tho. Hec.	%	Tho. Hec.	%	Tho. Hec.	%	Tho. Hec.	%
<b>Field Herbs</b>	18.868	67,7	17.935	67,5	15.789	66,0	15.723	66,0	15.575	65,7	15.532	66,4
<b>Fallow Lands</b>	5.324	19,1	5.040	19,0	4.108	17,2	4.114	17,2	3.998	16,9	3.697	15,8
<b>Vegetable</b>	635	2,3	930	3,5	804	3,4	808	3,4	804	3,4	798	3,4
<b>Fruit</b>	3.029	10,9	2.674	10,1	3.243	13,5	3.284	13,7	3.329	14,0	3.343	14,3
<b>Aggregate</b>	27.856	10,0	26.579	10,0	23.939	10,0	23.934	10,0	23.711	10,0	23.375	10,0

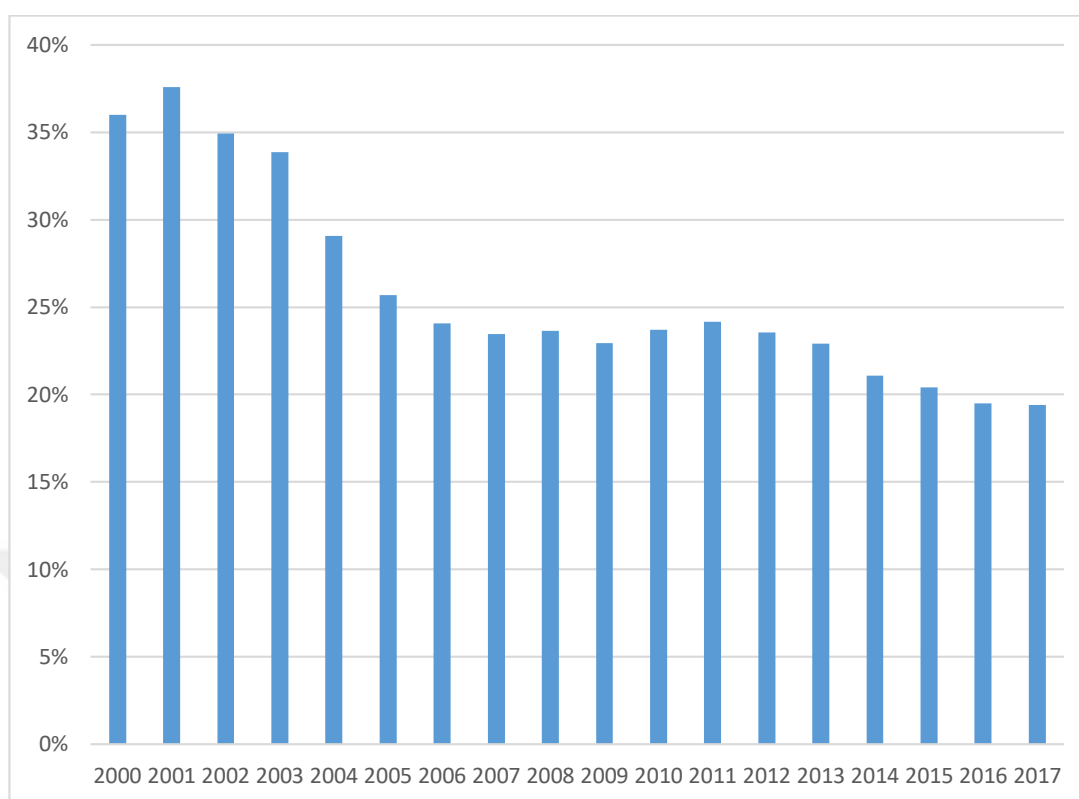
**Source:** Ministry of Agriculture and Forestry of the Republic of Turkey 2018<sup>8</sup>

As it was denoted in table 1, hectares of agricultural lands which contained period 1990-2017 have been shared. Field herbs have the highest rate. Vegetable is the lowest rate in the cultivation. While fruit propagated these hectare rates in the following years, the rates of field herbs, fallow lands and vegetable lowered. At the same time, identical instability is observed in the percentage rates. Although field herbs and fruit raised these rates, it hasn't affected the agricultural growth in a positive way.

When it was scrutinized in table 1, there is a conspicuous downswing in the production feasibilities of agricultural crops of Turkey. This decline began as of 1990, it continues nowadays. So, it indicates that Turkey doesn't have a steady agricultural cultivation within recent periods.

<sup>8</sup> <https://www.tarimorman.gov.tr/sgb/Belgeler/SagMenuVeriler/BUGEM.pdf>; accessed October 2018.

**Figure 8:** Employment in Agriculture of Turkey



**Source:** World Bank Open Data 2018<sup>9</sup>

As it was indicated in figure 8, employment rates of agricultural segment were delivered during period 2000-2017 in Turkey.

When employment rate was 36% in 2000, it boosted 38% one year later. However, it began to tumble nearly 35% again as of 2002. Then, a perennial downswing continued in following years. Besides, there is an abrupt downturn which was pinpointed in the employment rate of rural area in 2004. Even if a tiny upswing was observed in 2011, decline continued till 2017. As a consequence, it reveals a vast instability in the agrarian sphere of Turkey. At the same time, it evinces the deceleration of agricultural cultivation. Unfortunately, ranchers cannot propagate more crops in rural estates fairly.

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<https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS?end=2017&locations=TR&start=1991&view=chart>; accessed October 2018

When the structure of employment gets examined, agricultural segment keeps a substantial position as usual. However, share of the agrarian employment reduces stage by stage within total employment (Erdoğan ve Erdoğan, 2018).

**Table 2.** Registered Farmhand Number and Field

Year	Farmhand Number	Field
2002	2.588.666	164.960.378
2003	2.765.287	167.346.718
2004	2.745.424	167.099.180
2005	2.679.737	165.826.141
2006	2.609.723	164.930.261
2007	2.613.234	167.277.814
2008	2.380.284	157.694.645
2009	2.328.731	154.360.407
2010	2.318.506	156.309.390
2011	2.292.380	152.048.523
2012	2.214.537	153.449.052
2013	2.183.270	147.293.244
2014	2.206.874	149.276.892
2015	2.197.319	148.004.195
2016	2.267.176	147.858.630
2017	2.132.491	148.702.081

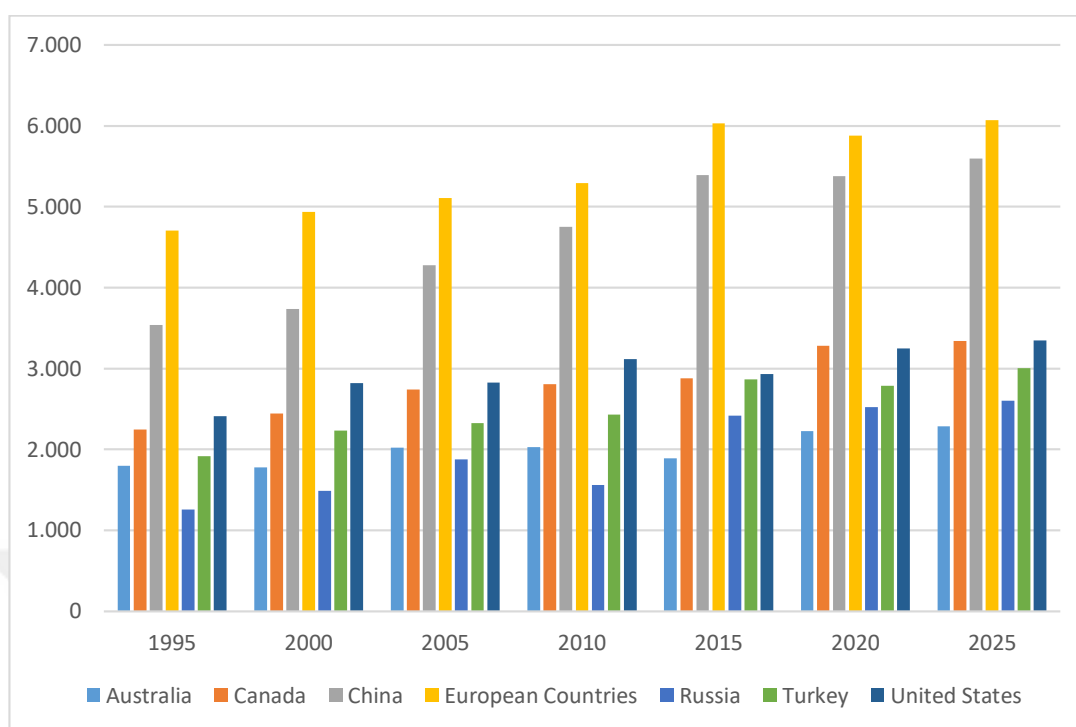
**Source:** Ministry of Agriculture and Forestry of the Republic of Turkey 2018<sup>10</sup>

With respect to table 2, farmhand number and field usages have been denoted. It includes period 2002-2017. Even if some rises appear from time to time concerning farmer number and field, there is no a specific progress for both of them.

Farmhand number and field usages are at the zenith in 2003. However, this rate began to scale down as of 2004. It keeps reducing till 2007. In 2007, an increase is observed about both of them. As of 2008, a wide decline continued in the farmer number and field capacity. It couldn't perpetuate the consistency about employment of farmhand and the expansion of field. Although recent upturn was pinpointed in 2014 on the behalf of farmhand number and field volume, it has generally indicated the downturn in other years.

<sup>10</sup> <https://www.tarimorman.gov.tr/sgb/Belgeler/SagMenuVeriler/BUGEM.pdf>; accessed October 2018.

**Figure 9:** Crop Production (Wheat, Tonnes/Hectare)



**Source:** Organization for Economic Cooperation and Development 2018<sup>11</sup>

As it was manifested on the figure 9, European Countries are at the zenith of crop production. Excluding China, European nations have a gargantuan ascendancy against other countries in each period. In 1995, it had 4.706 tonnes. This number kept soaring in the other periods. As for Turkey, it has also flourished its production capacity. However, it isn't adequate to reach the level of European Countries and China. As European countries boosted their production volume, China also kept maximizing its crop production capacity in the subsequent years. Besides, other states also made some breakthroughs in the next years in accordance with previous periods as well as European Countries.

When it is in 2020 and 2025, it is estimated that Europe and China will maintain their consistency against Turkey, Russia, Canada, United States and Australia concerning the crop production. Even if there is a decline in the crop production of 2020 for Turkey, prediction points out that there will be a steady expansion in 2025.

<sup>11</sup> <https://data.oecd.org/agroutput/crop-production.htm>; accessed October 2018.

**Table 3: Cultivation Areas of Some Plants**

Crops	Cultivation Area(1000 Hectares)							
	2010	2011	2012	2013	2014	2015	2016	2017
Wheat	8.103	8.096	7.529	7.773	7.919	7.867	7.672	7.669
Barley	3.040	2.869	2.749	2.721	2.787	2.784	2.740	2.424
Rye	141	128	143	138	115	112	115	101
Oat	88	86	89	93	94	103	99	113
Paddy	99	99	120	111	111	116	116	110
Safflower	14	13	16	29	44	43	40	27
Helianthus	641	656	605	610	657	685	720	780
Corn Grain	594	589	623	660	659	688	680	639
Colza	31	27	30	31	32	35	35	17
Dried Beans	103	95	93	85	91	94	90	90
Cotton Unseed	481	542	488	451	468	434	416	502
Lentil	234	215	237	281	250	224	252	293
Chickpea	456	446	416	424	389	359	360	395
Potato	139	145	174	126	130	154	145	143
Onion(Dried)	63	66	73	62	60	58	60	58
Soybean	23	26	32	43	34	37	38	32
Sugar beet	329	297	281	291	289	274	322	339
Tobacco	81	77	108	133	99	92	93	95
Tea	76	76	76	76	76	76	76	82

**Source:** Ministry of Agriculture and Forestry of the Republic of Turkey 2018<sup>12</sup>

According to table 3, cultivation areas of some plants are pointed out in a detailed way from 2010 to 2017.

<sup>12</sup> <https://www.tarimorman.gov.tr/sgb/Belgeler/SagMenuVeriler/BUGEM.pdf>; accessed October 2018.

A downturn is observed year by year in the cultivation fields of agrarian products. Excluding oat, heliantus, cotton unseed, lentil, chickpea and sugar beet, cultivation rates of all agricultural crops have reduced toward 2017. While some crops have an upturn in 2012, 2013 and 2014, cultivation rates have lowered in following years. So, there is no a stable cultivation which is yielded for these plants within current years. Also, there is a salient rate within this table. It is related to the cultivation rate of tea. Tea has a fixed cultivation till 2017. Then, it indicates a rise as of 2017.

**Table 4:** Production Amounts of Some Plants

Crops	Production Amounts(1000 tones)							
	2010	2011	2012	2013	2014	2015	2016	2017
Wheat	19.660	21.800	20.100	22.050	19.000	22.600	20.600	21.500
Barley	7.240	7.600	7.100	7.900	6.300	8.000	6.700	7.100
Rye	366	366	370	365	300	330	300	320
Oat	204	218	210	235	210	250	225	250
Paddy	860	900	880	900	830	920	920	900
Safflower	26	18	20	45	62	70	58	50
Helianthus	1.320	1.335	1.370	1.523	1.638	1.681	1.671	1.964
Corn Grain	4.310	4.200	4.600	5.900	5.950	6.400	6.400	5.900
Colza	106	91	110	102	110	120	125	60
Dried Beans	213	201	200	195	215	235	235	239
Cotton Unseed	2.150	2.580	2.320	2.250	2.350	2.050	2.100	2.450
Lentil	447	405	438	417	345	360	365	430
Chickpea	531	487	518	506	450	460	455	470
Potato	4.513	4.613	4.795	3.948	4.166	4.760	4.750	4.800
Onion(Dried)	1.900	2.141	1.736	1.905	1.790	1.879	2.121	2.132
Soybean	87	102	122	180	150	161	165	140
Sugar beet	17.942	16.126	15.000	16.489	16.743	16.023	19.465	20.828
Tobacco	55	45	73	90	75	68	70	80
Tea	1.306	1.231	1.250	1.180	1.266	1.328	1.350	1.300

**Source:** Ministry of Agriculture and Forestry of the Republic of Turkey 2018<sup>13</sup>

As it appeared in table 4, production amounts of some plants have been indicated in recent years. Upswings and downswings are pinpointed in proportion to the production amounts of some agricultural crops.

Wheat is commonly produced in Turkey. For that reason, wheat is the product which has highest production rate. While Safflower had lowest rate in accordance with other crops, it has raised its production amount in following years.

Some products have a decline about the production amount in 2012 but there is a rise for some crops in 2012. Besides, production amounts of some plants have lowered in 2014 but many crops have an upturn in the production rate as of 2015.

In spite of decrease in 2016, a lot of plants have maximized its production rate except a couple of plants in 2017.

### **1.7.Agricultural Trade**

When analysis of food regime was considered, Turkey has incurred a transmutation in the trade of agricultural crops. It contains the change of world trade and business segment. It can be observed as a parallel transformation periodically. Self-sufficiency and protectionism concepts have been argued. Also, it has affected the balance sheets of overseas trade and agricultural foreign trade. The largest portion of total export of Turkey has received from agrarian export till 1981. However, rate of non-agricultural export has begun to boost with the decisions of 24 January. In accordance with reports of Organization for Economic Cooperation and Development (OECD), it pointed out that Turkey was becoming one of the largest 10 food exporters in the beginning of 2000s. The decline of national product of agrarian sphere is a common continuum in the level of economic development correspondingly (Aydın ve Aydın, 2018).

Cycle of global warming is relevant to each determinant in the life. One of the most considerable spheres is agricultural segment in order to be able to sustain lives of the people. If sustainability of agricultural segment cannot be maintained, people

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<sup>13</sup> <https://www.tarimorman.gov.tr/sgb/Belgeler/SagMenuVeriler/BUGEM.pdf>; accessed October 2018.

cannot yield the foods in order to continue their lives. When evaluating it from global warming, it is associated with agrarian sphere because climate changes which ensue with the impact of global warming affect rural estates and agrarian crops in a negative way. By the time foreign trade relation of global warming gets considered, it is one of the most significant factors of advancement of overseas trade countries in the agricultural domain including Turkey (Taşçı, 2017).

**Table 5:** Agrarian Foreign Trade

Years	Export	Import	Foreign Trade Balance
2000	1.651,9	1.973,8	-321,9
2001	1.967,6	1.321,9	646,3
2002	1.743,9	1.590,8	153,1
2003	2.104,7	2.383,7	-279,1
2004	2.525,8	2.527,7	-1,9
2005	3.314,0	2.514,8	772,2
2006	3.466,6	2.634,3	832,3
2007	3.709,4	4.352,8	-643,3
2008	3.923,4	6.151,3	-2.228,0
2009	4.347,4	4.593,8	-246,40
2010	4.934,7	8.895,1	-3.960,40
2011	5.166,6	8.869,3	-3.702,70
2012	5.188,6	7.446,6	-2.258,00
2013	5.653,3	7.718,0	-2.064,70
2014	6.029,7	8.588,5	-2.558,80
2015	5.756,6	7.176,3	-1.419,70
2016	5.397,2	7.041,3	-1.644,10
2017	5.287,6	8.990,7	-3.703,10

**Source:** (Aydın ve Aydın, 2018)

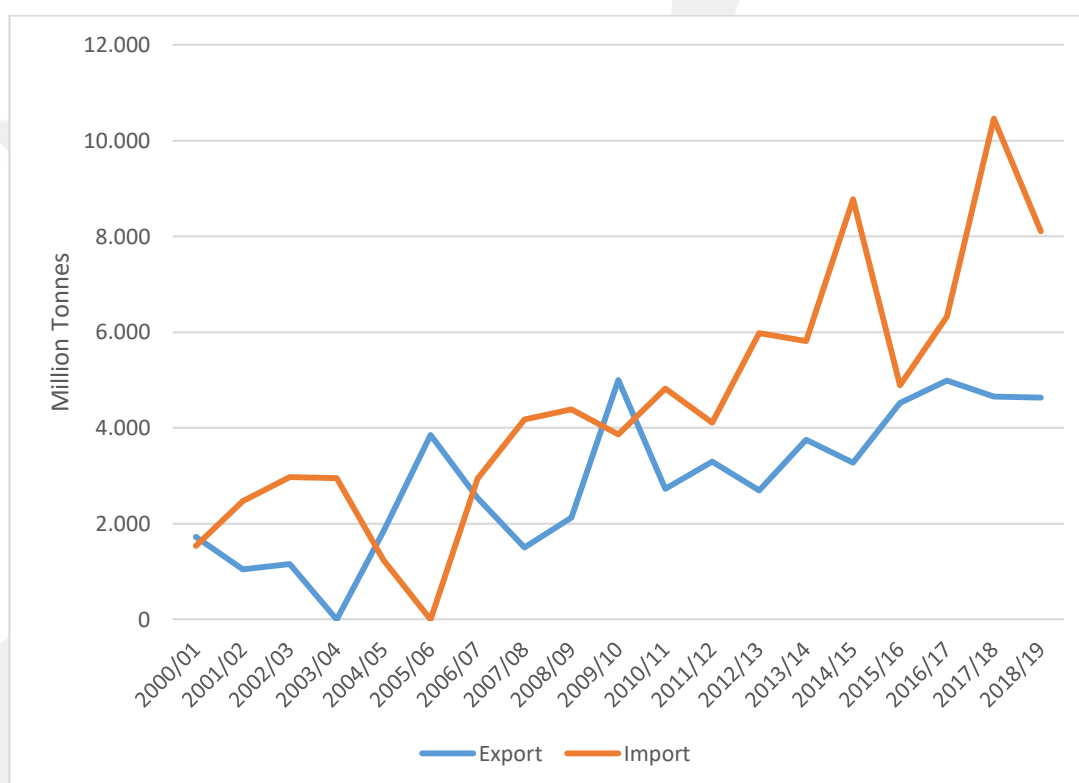
With respect to table 5, agrarian foreign trade of Turkey has been pointed out between period 2000-2017. There is a salient downswing in the overseas trade of agricultural segment of Turkey.

Export rate has only a profitability in 2001, 2002, 2005 and 2006. Excluding these years, import rate has a vast ascendancy against export. When export rate of

Turkey yielded the highest effective return within this period in 2006, it began to lose its profitability concerning agricultural foreign trade. Especially, interval of the agricultural foreign trade scaled up between export-import rates as of 2008. Also, this number rose to 8.869,1 in 2010.

Even if import lowers a tiny amount after 2010, it keeps boosting till 2017. In this case, it impinges on profitability rate of Turkey in this segment negatively. At the same time, Turkey confronts with a gigantic current deficit in the agrarian sphere.

**Figure 10:** Import-Export of Total Cereals of Turkey



**Source:** Food and Agriculture Organization of the United Nations 2018<sup>14</sup>

In accordance with figure 10, import-export amounts of total cereals have been manifested as million tonnes about Turkey. It contains 19 years. Export rate is a little bit higher than import in the beginning period but a downswing ensued in the export rate of total cereal as of 2001/02. It continued till 2004/05. Henceforth, export rate of total cereal has shown unsteady changes in period 2005/06.

<sup>14</sup> <http://www.fao.org/statistics/databases/en/>; accessed October 2018.

Although Turkey launched 2.126 million tonnes of cereal export in 2008/09, import has reached 4.387 million tonnes. It implies that import rate is far higher than export number. Export rate is higher than import during 2009/10. It raised 4.996 million tonnes. As for import rate, it reduced 3.868 million tonnes. In the subsequent years, import rate perpetuates its supremacy against export in the total cereal. When it reaches 2018/19, it has been predicted that import was lower than export rate. Even so, it is higher than total cereal export. In this case, Turkey has a large current deficit concerning the cultivation of total cereal. At the same time, there is no a profitability for Turkey about cereal propagation.

### **1.8.Urban Immigration and Rural Population**

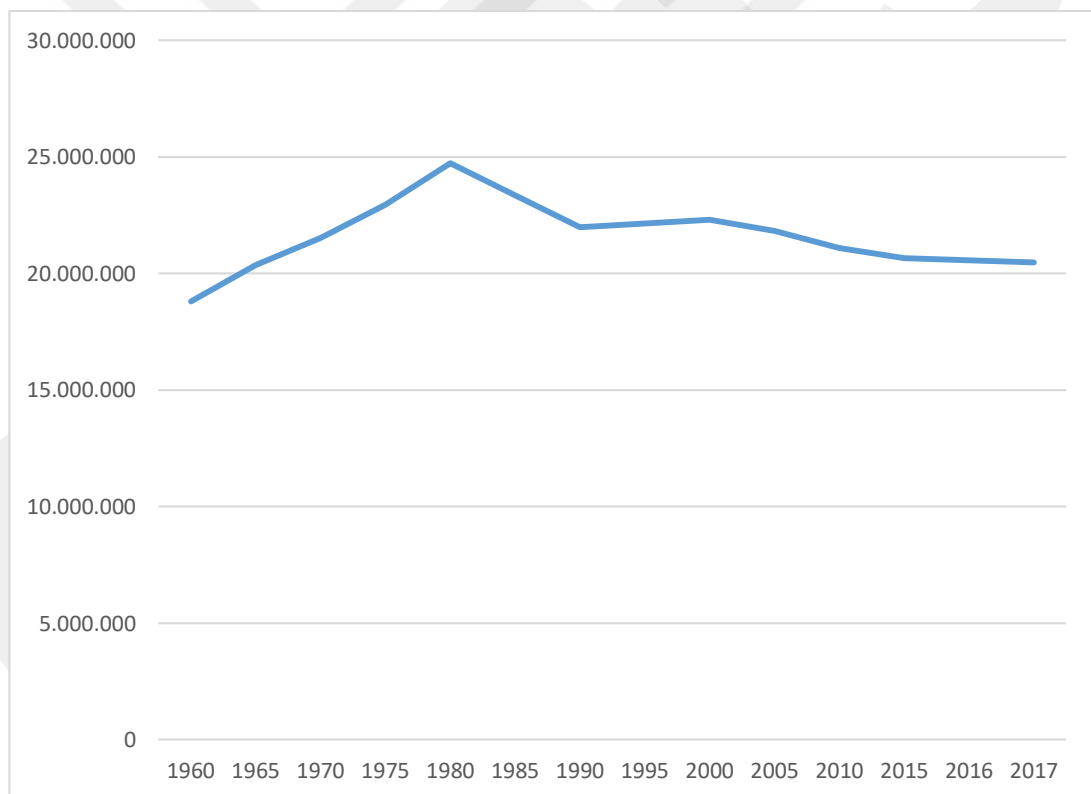
There are diverse types of considerations concerning the people who live in rural areas and immigrated to large cities in Turkey. Instead of counting these factors, it is significant to determine relationship between rural emigrations and socio-economic dimensions. Especially, geographic and cultural conditions have a crucial impact about this issue. It can dispense a more detailed and viable information regarding this topic. That's why the analysis of socio-economic factors which affected immigrations from rural areas to urban have manifested a wide significance (Gürbüz ve Karabulut, 2008).

1950s are the periods which began the emigration process from rural lands to cities. Also, it was a period which began to accelerate with the impact of social and economic changes. Generally, world system runs with modernization and mechanization of agriculture but it has any other factors such as change of conventional landownership framework, downswing of agrarian fertility, inadequacy of agricultural income and developments in the transportation circumstances. For this reason, indigenous people who lived in countryside have emigrated to cities in a rapid way. Due to the modern inheritance law enforcement, some local villagers who lived in the rural areas began to lose their agricultural cultivation ways in the aftermath of structural change of agricultural enterprises (Yıldırım, 2014).

The population rate of rustic land has remained constant within total population between period 1927-1950 in Turkey. As 75,8% of population lived in 1927 in rural regions, this rate was 75% in 1950. As of 1950, the emigration condensed from rural

territories to urban parts of the country. When population rate of rural area was 75%, it lowered to 68,1% in 1960. Then, this rate scaled down 61,5% in 1970. It decreased 56,1% 10 years later. During 1990s, this number has declined 34,9%. As rural population rate was 23% in 2012, it reduced till 9% in 2013. When interval of the rural population was revised for 2 years, it has denoted that a substantial endogenous immigration occurred within the country. Furthermore, there is a vast difference in terms of the development between the cities and peripheries. Transregional imbalance has pinpointed the causes of domestic emigration which occurred from countryside to the urban. Also, it keeps occurring in recent years. Unbalanced distribution of social well-being has been distributed. For that reason, it leads a large emigration. In addition, it is the determinant which reveals the disparity (Sevinç et al., 2018).

**Figure 11:** Rural Population of Turkey



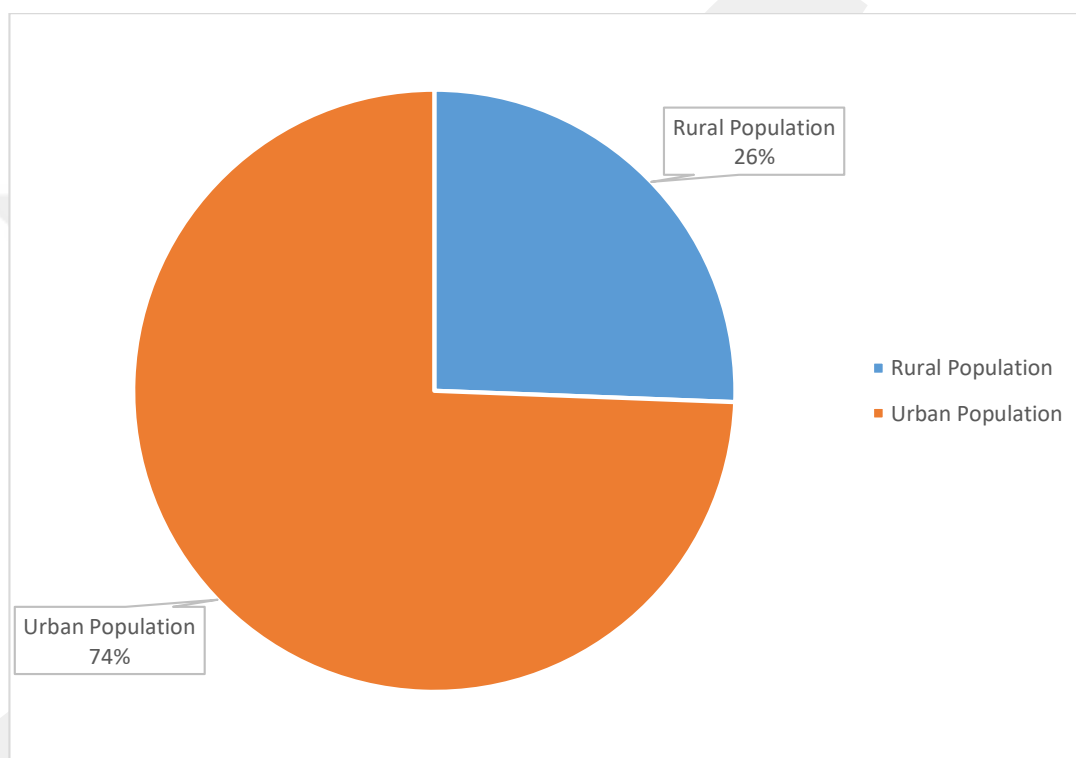
**Source:** World Bank Open Data 2018<sup>15</sup>

According to figure 11, rural population rates of Turkey have been manifested within period 1960-2017.

<sup>15</sup> <https://data.worldbank.org/indicator/SP.RUR.TOTL?locations=TR&view=chart>; accessed October 2018.

A stable upturn was observed from 1960 till 1980 in the rural population of Turkey. However, an abrupt decline began after 1980. This downswing has accelerated as of 2000s. This downturn continued in 2017 as well. It mostly stems from the impact of socio-economic factors. Furthermore, immigrations which occurred from countryside to city in the country have also affected the growth of rural population of Turkey in a negative way.

**Figure 12:** Rural and Urban Population 2017



**Source:** Food and Agriculture Organization of the United Nations 2018<sup>16</sup>

As it was pointed out in figure 12, the percentage rates of rural-urban population of Turkey have been shown in 2017. A large upswing is observed in the urban population rate of Turkey. Rural population has a drastic decline.

It revealed that agricultural domain has incurred a big change in recent times. It is supposed to be expanded in Turkey but it keeps decelerating with the impact of urban immigration because there is no a steady propagation in rural estates of the country.

<sup>16</sup> <http://www.fao.org/faostat/en/#country/223>; accessed October 2018.

## **1.9.Agricultural Irrigation**

Agricultural irrigations are in the forefront about the largest water consumption categories in the world and our country. Irrigation is one of the most crucial elements in terms of food cultivation and rural income. It is an obligation to develop water management affairs for both a higher rural income and water productivity. At the same time, agricultural irrigation is a significant consideration concerning pervasion of social welfare, acceleration of economic-sustainable growth and rise of agrarian fecundity. Significance of the irrigation and management raises each passing day. It cannot satisfy the demands of increasing supply. It has converted into a strategic topic with the water (Aydoğdu et al., 2015).

Total of 6225 million hectares have been opened by now in Turkey. Irrigation networks which were founded and operated by State Hydraulic Works (SHW) have been devolved on multiple user organizations as of beginning of 1990s in the aftermath of management, maintenance and governance responsibility. However, researches which were conducted on the success of irrigation networks couldn't roundly reach expected goals after takeover (Değirmenci et al., 2017).

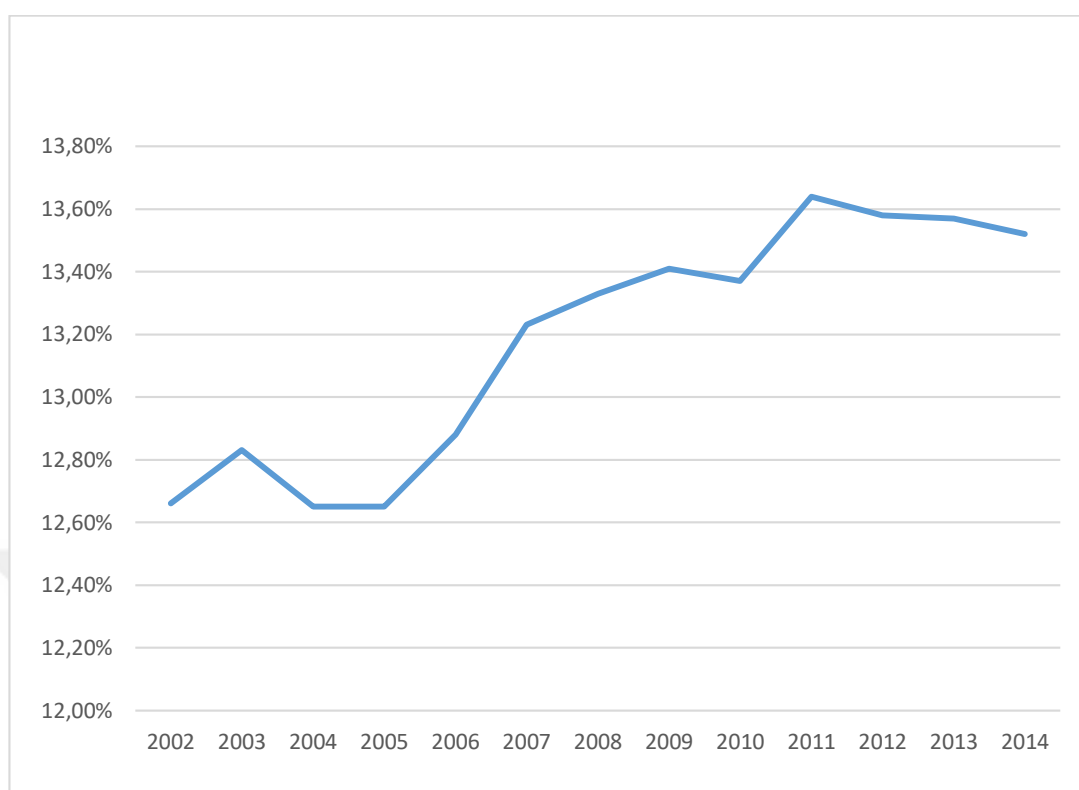
Water of the irrigation hasn't reached the expected flow rate due to global warming and time shortage. However, utilization has begun to raise in the cultivation of each type of plant excluding eastern Black Sea territory. It has been revealed that available agricultural fields wouldn't be scaled up nowadays. Other assets that are like irrigation, fertilizing, disinfection, wholesome seed and energy usage need to be utilized in the optimal level in order to maximize agricultural fecundity. Particularly, irrigation is the most substantial method of these practices that ensure the determination in the agricultural output. Also, it augments efficiency of the other agrarian inputs (Özdemir ve Dağdelen, 2015).

Irrigation and tillage get carried out unconsciously in the rustic lands in Turkey. Additionally, there are no adequate researches and operations concerning irrigation methods. It also uncovers various problems about this issue. Another factor is also related to rise of local population in the country. Therefore, water resource that is utilized in our country gets depleted unconsciously. On the other hand, it is affirmed that researches, initiatives and investments aren't commonly in the adequate level

countrywide. In addition, ventures and investment possibilities which needed to be actualized in the agrarian segment have been transferred to the industrialization. It also diminished significance of water assets and topsoil relatively (Özmen et al., 2015).

Water potential is nearly 1640 m<sup>3</sup>/ year per head in Turkey. In accordance with international criteria, a country needs to have 10000 m<sup>3</sup>/ year per head utilization to be counted as a water prosperity. If this amount is 3000-10000 m<sup>3</sup>/ year, a nation which has adequate water is 1000-3000 m<sup>3</sup>/ year. If a country having a water problem is below 1000 m<sup>3</sup>/ year, it is accepted as a destitute nation in terms of water assets. In this case, Turkey will become a nation which has water problem. At the same time, it will keep becoming a country which boosts water problem with the impact of a rising indigenous population each passing year. It is predicted that local population of Turkey will be 100 million. For this reason, it sets off a big concern due to roughly 1000 m<sup>3</sup>/ year per person and turning into the water shortage. The period which contained between 1980-2000 has risen total water depletion in 256% rate. When water utilization was 11.8 billion m<sup>3</sup>/ year, this rate has soared to 42 billion m<sup>3</sup>/ year in 2000. Moreover, water usage would absolutely raise within next 30-year period. It will simultaneously scale up agricultural irrigation when droughts get figured out along with the global warming. Thus, prodigious problems would occur about water issue. It unearthes the extent of dominant governance and enterprise in the agricultural irrigations which utilize 75% of total water (Aydoğdu et al., 2015).

**Figure 13:** Agricultural Area Irrigated – Share in Agricultural Land



**Source:** Food and Agriculture Organization of United Nations 2018<sup>17</sup>

According to figure 13, irrigation rates of the agricultural lands of Turkey have been shown within period 2002-2014.

Although irrigation rate rose from 12,66% to 12,83% in 2003, it has diminished in the subsequent periods. Nevertheless, irrigation of rural field made an immense progress as of 2006. Also, an abrupt upswing is pinpointed in these rates till 2009. Even if a rise continued in 2011, it kept lowering in following years.

So, there is no a conspicuous rise in the irrigation amounts of lands. It commonly originates from the effect of climate changes. In addition, another factor is also related to cultivation. Irrigation cannot be carried out steadily without cultivation of vegetable, fruit and crops. In this case, more products should be nurtured in the farming lands in order to raise the irrigation amount.

<sup>17</sup> <http://www.fao.org/faostat/en/#data/EL>; accessed December 2018.

## CHAPTER TWO

### 2. REVITALIZATION OF AGRICULTURAL SECTOR IN TURKEY

#### 2.1. Contributions of Agricultural Segment to Economics

Agriculture is an irreplaceable sphere in terms of human requirements and economy of the country. When it gets assessed in point of history, improvements which were carried out about issue of the agricultural output haven't lost this importance. In other words, when it gets reckoned in terms of historical, inhabitants who lived in the advantageous lands in the way of agricultural have utilized the opportunities within the sphere in the best way. It has specified that they made an immense economic progress. Such that, starving population has drastically scaled up in the world. It has unearthed the necessity of this materiality that agriculture created (Sakarya et al., 2007).

Agricultural output and feasibilities that stated the efforts of harvest and plantation according to soil have had a critical role in the transition from nomadic order to a localized order. At the same time, it has roughly determined destiny of the humanity throughout 10000 years. Agriculture that almost entails government intervention and considering market economic conditions has a strategic significance as a whole in each state (Tokathioğlu et al., 2018).

Agricultural scopes have become one of the essential economic activities for all nations throughout history of the humanity. This case is valid nowadays as well. Agrarian sphere has a crucial liability in the national economy. Although there is a rise in the technological advancements, service segment and business opportunities, agricultural domain is a division that has a vital significance for states. Particularly, it can be estimated that agrarian segment has welfare level in the advanced regions before industrial revolution. Consideration of agricultural sphere has been perpetuated on the economic advancement after industrial revolution as well. That's why

agricultural development is one of the substantial components of economic enhancement (Ersoy ve Özsoy, 2017).

Although allotment of the economic scopes of agricultural domain declined from time to time in the advanced states, it has attained swift growth which ensued in the industrial sector. It has remained as a secondary segment. It has pointed out that agrarian segment soared the contribution in the nutrition of population in the way of farm crops and diminished dependency to the abroad. Additionally, agricultural sphere has shown a crucial role in the beginning stage of economic growth due to having a leading share for thriving nations on the economy (Uzay, 2000).

Total allotment of the agriculture in the employment is higher than share of the aggregate output within this period. In fact, agrarian domain has a vital significance for each country. It is an activity which doesn't need to be disregarded in sustaining economic independence of the developed states as well, not only in building up for countries which are in the recovery step successfully. Agriculture that creates the first phase in stimulating the advancement of underdeveloped countries contributes to the economic growth from diverse perspectives (Erbay, 2013).

Agrarian domain has an importance in the different level in the economics by depending on the recovery levels of economics in terms of socio-economic criteria. Agricultural segment can generally be evaluated in the economy of country with these contributions; to the population, workforce, fecundity, output, nutrition of the society, industrial sector, national income and overseas trade (Semerci, 2018).

### **2.1.1. Position and Significance of Agricultural Segment In Turkish Economy**

Agricultural sector has a considerable role within the economic, social and political development continuum of Turkey. Especially, agrarian sector was in the dominant domain position during first eras of the economic expansion. Agricultural segment safeguards its materiality in Turkish economy by directly contributing to nutrition of the country population, contribution to national income and employment, protection of the raw material of industrial sphere, transferring capital to industry and export potentials (Erdoğan ve Erdoğan, 2018).

Agrarian segment contributes to the expansion through diverse types of pathways by having a broad potential in Turkey. Agricultural domain streamlines employment to nearly 30% of the employed population. It is just a sector that is worth minding owing to reason of importance within the employment (Çatal, 2007).

Agriculture accentuates in terms of social, territorial, cultural, ecological and political activity as well as economic scopes. Agrarian sphere has undertaken substantial duties in the economic and social advancement of all countries thus far. It is expected that it will resume these tasks in the future. Furthermore, industrial sector has been considered in the aftermath of economic developments which ensued in Turkey after republic period. However, agrarian domain has kept safeguarding its significance within the country economy from a lot of adverse determinants. While relative share tumbles in the formation of national income year by year in Turkey, position and significance of this segment is great in Turkish economy due to general employment, input to industrial sector, service segment and contribution to overseas trade (Erdoğan ve Erdoğan, 2018).

Turkey is at the seventh standing world-wide in point of agricultural output value but it is at the first place between European Nations. When export value of Turkey was 142.5 billion dollars in 2016, share of the agricultural and food products has taken place 10.7%. Import value of Turkey was 198.6 billion dollars in 2004, share of agricultural and food products has occurred 5.9% within the same year. So, agricultural and food products of Turkey have possessed surplus in the foreign trade as of 2016. When agricultural crops were just considered, circumstance of Turkey has seemed more different than general prospect. By the time import of the agricultural products of Turkey was 7.04 billion dollars in 2014, export of the agricultural crops has remained with 5.4 billion dollars within the same year. On the other hand, overseas trade deficit of agricultural crops which was denoted in that year has reached 1.6 billion dollars (Semerci, 2018).

Turkey has a significance in the foreign trade numbers of Turkey as well. In particular, it has been among the most important component of export during the first years of republic period. Also, agrarian segment has an impact on the output determinants and domestic markets. There is a close relationship between agricultural sphere and output factors. For instance, share of the agricultural sector was 80% in the

total employment rate of Turkey during 1950. However, it has dwindled with 58% in 1980. Then, it knocked down 26% in 2013. Even though a decline occurred with these numbers year by year, it has been proved that agrarian sector attained a considerable position in the employment (Ersoy ve Özsoy, 2017).

Agrarian domain has seemed as one of the essential sectors of economy when it was assessed for Turkey. Data that were published in the sphere have pointed out that agrarian segment had a substantial share with marcoeconomic considerations like employment, overseas trade and growth. For that reason, revival of the agrarian sector affects recovery of Turkish economy in the general sense (Ersoy ve Özsoy, 2017).

## **2.2. Sustainable and Good Agricultural Practices in Turkey**

Legislation which was associated with good agricultural practices has been promulgated in 8th of September 2014 in 25577 Issue Official Gazette. In accordance with first provision of the legislation, goal of the good agricultural practices is to protect human, animal health and embracing environmentally-friendly agricultural output. At the same time, it contains facilitation of the agricultural traceability and sustainability. This intention entails an output paradigm along with protection of the natural resources and food security. Legislation specifies standards, rules and provisos with good agricultural practices (Eryılmaz ve Kılıç, 2018).

Certification bodies and authorized control are available in the field plants with arboriculture, seedling, tea, ornamental plants, flower, vegetable, fruit and age as part of good agricultural practices of Turkey. For this reason, producers are supposed to acclimatize to environmental and physical conditions in the good agricultural practices in order to boost competitive power in the international markets. Transferring to good agricultural practices doesn't just enable producers to raise competitive power in the domestic and overseas market. At the same time, it will positively contribute to health of the consumers in both Turkey and nations which launch export potentials. Good agricultural practices don't merely offer health of individuals who consume abundant agricultural products. In addition, it enables the clerk to spearhead proper output in accordance with hygienic procedures. Thus, it minds health of the employee (Yaşar, 2017).

**Table 6:** Good Agricultural Practices in Turkey

Year	Province Number	Producer Number	Output Area
2007	18	651	53,607
2008	19	822	60,231
2009	42	6020	1,702 804
2010	48	4540	781,741
2011	49	3042	499,632
2012	47	3676	837,171
2013	56	8170	985,009
2014	53	21332	2,147 705
2015	61	39740	3,465 695
2016	64	55609	4,741 075

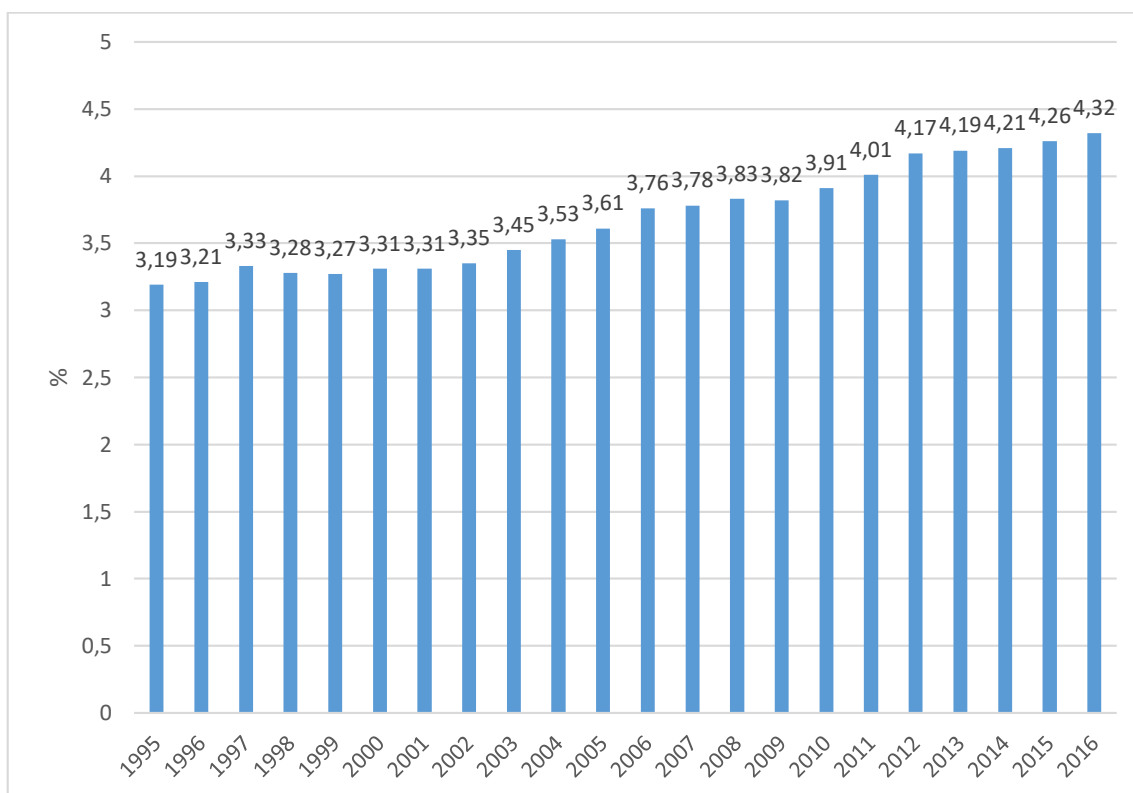
**Source:** (Eryılmaz ve Kılıç, 2018)

As it was manifested in table 6, amount of province, producer and output area have been shown in the good agricultural practices of Turkey.

An increase is observed in the rate of provinces which embark on the scopes in the agrarian segment in the aftermath of good agricultural practices. When Turkey had 18 provinces within agricultural potentials in 2007, a swift rise has occurred as of 2009. On the other hand, producer number and output area have also showed some upswings one by one till 2016. Although producer number and output area incurred a downturn, this rate has kept soaring in 2013 consistently. They reached the culmination in 2016.

As a consequence, as long as Turkey maintains good and sustainable agricultural practices, any other progresses can entirely occur. It enables this sector to flourish in a stable way within the country.

**Figure 14:** Permanent Cropland (% land area)



**Source:** World Bank Open Data 2019<sup>18</sup>

According to figure 14, permanent croplands of Turkey have been denoted by numbers between period 1995-2016.

Permanence rate of the cropland is 3,19% in 1995. Then, a steady upturn is observed in the permanence amount of croplands each passing year. Even if it reduced with 3,28% in 1998, it has carried on its rise in the next periods. In particular, it pointed out another increase as of 2012. It soared to 4,17%. Also, it has reached the zenith with 4,32% in 2016.

It can be told that there is a conspicuous progress about permanent croplands of Turkey in the aftermath of sustainable and good agricultural practices. So, these practices should definitely be maintained regularly.

<sup>18</sup> <https://data.worldbank.org/indicator/AG.LND.CROP.ZS?locations=TR&view=chart> ; accessed July 2019.

### **2.3.Financing Agriculture in Turkey**

Agricultural subsidy and credit undertake an important role in order to consummate insufficient capital in the output and helping agricultural enterprises reach in the extent of economic scale. Rapid changes and enhancements have occurred in the agricultural credit domain of Turkey during the recent years. Implementations of the private banks have gradually raised toward finance of the agrarian sphere as well as Agricultural Bank within this process. One of the significant elements of rural development which is subsidized by public assets throughout years is credit facility of the agricultural enterprises. Also, this situation has transmuted private sphere resources into an active structure. Subsidy is granted by banks and cooperatives to rural development in the financial sphere in today's Turkey. On the other hand, grants and incentives get delivered by public institutions as part of state policies. Output framework has thrived in the rustic area with impact of the changes which ensued in the agrarian sphere. Organized associations that allocate financial subsidies to agrarian industries and input have been formed. Thus, crediting policy implementations have frequently appeared by accentuating agricultural system and properties of the feasibilities. Additionally, 10016 issue verdict which was rendered by cabinet has been promulgated as subsidy of rural advancement investments. Henceforth, it has been confirmed that subsidy payment would be carried out with 5-year period for equity-based project investments that will be made individually or together (Koçtürk et al., 2013).

Agricultural Bank of Turkish Republic (ABTR) firstly lets producers utilize subsidized agricultural credit in some issues. It subsumes greenhousing, utilization of certified seed, diverse domains of the animal production and organic agriculture within the context of credit policy implementation in 2004. Sustainability of the agricultural output seeks to be provided via subsidized credits that are used in rising scales. It contributes to the solution of financing problem which is one of the hindrances for a sustainable production by tackling lack of funding of the producers through this pathway (Tosun ve Güneş, 2017).

Other considerable fund asset is agricultural credit cooperatives in the agricultural financing of Turkey. Funds that belong to cooperative commonly consist of funds which are distributed by Agricultural Bank and cooperative members (Yalçınkaya, 2018).

### **2.3.1. Agricultural Credits in Turkey**

Occuring economic hardships, rapid population rise, increase of the demand of food product each passing day maximize the materiality and exigency of the agrarian sphere. For that reason, it is imperative to be fostered in order to intercept agricultural segment against adverse conditions and influences. Agricultural credit is a significant consideration in the expansion of investment framework of agrarian sector in thriving countries and advanced nations within this phase. At the same time, it is a crucial mediator of the agricultural advancement. As a matter of fact that utilizing credits has influentially appeared between basic goals in the supply of agricultural enhancement as part of all development plans and programmes (Adanacıoğlu et al., 2017).

It is possible to define the credits which are utilized by agricultural output aim as agricultural loan. The major goal of agricultural credits is to boost agricultural output when it is reckoned that credits are required in case of fund inadequacy. That's why significance of the agricultural credits uncovers against fund insufficiency in order to scale up agricultural output in Turkey (Yalçınkaya, 2018).

Credit subsidies get implemented by Agricultural Bank of Turkish Republic in the scales which raise in recent years toward sector as well as support payments. It gets mobilized by intention of scaling up efficiency, fertility and competitive power in the agricultural output. Agricultural credit system has been implemented through agricultural credit cooperatives and joint-stock company directorate general of Agricultural Bank of Turkish Republic throughout many years. Agricultural credit volumes of the private banks have begun to boost in recent times. In this case, 2004/6480 issue "low interest investment toward development of agricultural production and being associated with utilization of working capital loan" was commenced by decision of cabinet for low interest loan formulation in the agriculture. It has emanated from problems which occurred concerning credit usage in the agrarian sphere. 0,41 billion Turkish Lira was used by Agricultural Bank of Turkish Republic as low interest agricultural loan for 48500 producers first time in 2004 within this scope. Subsidized credits that began to be implemented as of 2004 have become a substantial determinant in the favourable developments within the sector in recent periods. Moreover, workload of Agricultural Bank of Turkish Republic has excessively soared with this implementation. Legal procedures which raised in the usage of subsidized credit have forced clerks of the agricultural credit services of

ABTR to an abnormal work pace as well as a long and strenuous process in the use of agricultural credits. For this reason, it will be more advantageous for both business managers and employees along with carrying out usage of these types of loans via other banks. Also, it will enable private banks to undertake a social mission in addition to profitability. Earnings of the agrarian segment are more crucial than competition which detects in the existing agricultural credit market. Determination of the implementations in accordance with special condition and structural circumstance of the agrarian segment basically entails risk sharing regardless of convenient interest, territory and area as part of this continuum. Acquisition of the agrarian segment of Turkey should be handled as privileged target. Subvention and implementation of the interest rate which was perpetuated along a couple of years should largely be sustained about agricultural credit issue (Tosun ve Güneş, 2017).

Agricultural credits which become one of the most pioneering tools of agrarian policies play a role in the dimension which won't be disregarded in the tussle with rural destitution and growth of the segment. A huge part of agricultural associations which are designated as small enterprise don't have scopes in the saving due to low annual income level and fluctuation about production pattern in Turkey. Thus, it turns into a precarious situation. Therefore, entities are forced to cover deficiency of the equity capital through credit establishments. One of the crucial points of agricultural credits is that growers utilize the credit in the time with easy and convenient wage (Tosun ve Güneş, 2017).

### **2.3.2. Diffusion of Agricultural Cooperatives**

One of the most significant factors of sustainable success of the agricultural output stems from good organization of the ranchers in point of economic, social, technical and ecological. One of leading methods is to be organized with cooperatives in the unification of farmers. Cooperative system which differently enhances as third segment as well as public-private sector has a considerable impact in the agrarian development. Agricultural potentials get spearheaded under diverse genres of perils. One of the most momentous pathways of curtailing the perils and holding the sphere in the powerful position is to be organized by cooperatives. The most significant mission of agricultural cooperative is to safeguard economic rights of the ranchers.

Furthermore, it takes on a substantial role in the local and regional advancement with economic advantages that are taken for farmers (Şahin et al., 2013).

Agriculture is a foremost sphere in the cooperative system as a practical domain in the globe and Turkey. Cooperative agricultural associations have been founded with the intention of protecting economic benefits, evaluating products better, catering for needs of vocational activities as part of agricultural output potentials. Also, suretyship, interdependency and reciprocal aids can be involved in this affair. In this case, associates assure output inputs by purchasing the products in the best circumstances in order to achieve these purposes. If it is required, it mobilizes the possibilities in order to satisfy financial requirements of the partners via money loan by converting into finished goods and introducing to the market. In addition, inputs of the villagers and hard cash demands create mental basis of the cooperative system. Satisfaction of input demands of the agricultural growers and product marketing still appear in the austere drawbacks of agrarian sector. The most influential and easiest way is to embark on the trade with association and relationship of the cohesiveness. Cooperative agricultural associations have managed to sustain its scopes despite intervention of the economic crisis and political authority. With respect to data of directorate general of the trade ministry, 54.600 active cooperatives, 7.00.851 cooperative associates, 529 units and 14 central unions have been determined in Turkey as of 2017. 12.340 registered cooperatives work as cooperative agricultural associations. These cooperatives have 3.893.167 associates. Cooperative agricultural associations have carried out their top organizing under 147 unions and 8 central unions. Furthermore, cooperative agricultural associations offer services and feasibilities which were determined in the essential agreements. They have transmuted into multipurpose structure with changes which were implemented in the major treaties in recent years. Diversification of the activity and service can boost and diversify prospects of the associates (Başaran et al., 2018).

Agricultural cooperatives get established in the rural settlement units which are like village, province and county center in order to mobilize the activities that encompass study, intention, duty and responsibility domains with ministry of food, agriculture and livestock in Turkey (Kara et al., 2016).

Organizing model in the agriculture is just like economic organization, aim of formulating policy and organizations of the voluntary entities in Turkey. It is comprised of triple structures; cooperatives, producer organizations and agrarian chambers. Cooperatives are responsible for economic section of the rancher. Producer organizations are in charge of policy formulation and branch of forming lobby. Agrarian chambers are also vocational section that creates a bond between rancher and government. Duty and functions of the organizations are also significant to complement each other in this structuring. Moreover, approximately 15% of 88.000 cooperatives belong to agrarian cooperatives according to data of year 2009 in Turkey. General characteristic of the cooperative system is prevalent with low partnership cooperatives. Particularly, agricultural development cooperatives supply services to the goal of scaling up income of the inhabitants living in the rural area and subsidy of the animal husbandry sphere (Özdemir et al., 2011).

#### 2.3.2.1. Agricultural Development Cooperatives

Agricultural development cooperatives are the corporations that work in this sector in order to boost economic power, assisting advancement of the associates in the way of economic and social dimensions, launching indemnity, supply, operation, marketing and evaluation activities about their needs and thriving agricultural outputs of the associates. Agricultural development cooperatives generate 60.2% of the agricultural cooperatives in Turkey (Topuz ve Bozoğlu, 2015).

Number of the agricultural development cooperatives is 8173 in accordance with data of Ministry of Customs and Trade (MCT). Common number is 842.563, zone union is 82. Also, number of cooperative that is dependent on this union is 4939. Central union is 4 and union number belonging to central union is 77. It seems number of the associates and agricultural cooperatives in high level in Turkey like advanced countries by accrediting these data. Whatever the status is, it particularly plays a considerable role in terms of benefit and continuation which is provided in the countryside. Associates and these sorts of cooperatives generate commercial scopes and employment about this issue. In other words, it can be stated that they actualize activity functionally and their contributions to sustainable development as well as high numbers (Kara et al., 2016).

### 2.3.2.2. Agricultural Credit Cooperatives

Agricultural credit cooperatives which become one of the largest farmer organizations of Turkey take on a momentous role about point of sustainability and advancement of Turkish Agriculture as it gives confidence to Turkish rancher. Agricultural credit cooperatives bolster benefits to their partners in terms of social and economic. It offers ranchers and partners who need agricultural inputs by setting up plants with a low cost such as fertilizer, provender, pesticide and plastic. Besides, it maximizes payment transactions by providing loans with appropriate interest rates. Then, it introduces in the open market by purchasing products that are yielded by associates and contributes to its operation of those crops (Öz ve Kızılaslan, 2019).

Agricultural credit cooperatives have firstly been founded as dependent on the ordinance of 1924 Issue of Agricultural Credit Cooperative and 1929 Issue of Agricultural Credit Cooperative. Fund assurance gets provided by vouching each other of the association members in the agricultural credit cooperatives. This application minimizes credit risks (Yalçınkaya, 2018).

Agricultural credit cooperatives are the second largest entity after Agricultural Bank of Turkish Republic in the agricultural credit domain. Shares are nearly 12% in accordance with data of 2007 in this sphere (Özdemir et al., 2011).

It is very tough to receive credits from banks for ranchers nowadays. In particular, small crofters cannot count on the banks concerning issue of receiving loan. On the other hand, there is no a conspicuous indemnity in order to be able to receive the credit. In this case, a lot of drawbacks occur concerning this subject. That's why crofters are supposed to defray credit needs in order to initiate their outputs. It is certain that agricultural credit cooperatives are organizations to cover credit needs of the ranchers. Agricultural credit cooperatives have become the most rational credit requirement in order to deliver modern input utilization and safeguarding farmers from adverse situations (Özolgün, 2018).

Agricultural credit cooperatives are the establishments which were founded by goal of providing the loan to associates in the most proper conditions. Credit cooperatives commonly seek to raise with a low interest and cost to ranchers. Hence, farmers who cannot receive loan in the adequate level from people and banks with opportune circumstances can apply to leading agricultural credit cooperatives.

Besides, agricultural credit cooperatives are the enterprises which try to provide affordable loan to their partners by reconciling between account owners and credit entities (Sayılı ve Adıgüzel, 2013).

#### 2.3.2.3. Agricultural Sales Cooperatives

One of the leading functions of agricultural sales cooperative associations and unions of agricultural chambers of Turkey is related to enlargement of the domestic market. These establishments bolster fertilizer, pesticide and utilization of the contemporary instrument with multifarious ways. Especially, price policies which were unveiled by government have undertaken a significant role in the diffusion of sturdy consumption goods. On the other hand, agricultural sales cooperatives and associations are crucial with inspection system in terms of the agricultural output tax (Koç, 1984).

Reconstitution of agricultural sales cooperatives is venture support care as well as direct income support system. In 2000, an agreement has been ratified concerning the economic reform loan with World Bank. One of the fundamental guidelines is to stimulate agricultural growth and formation of the agrarian income. Agricultural Reform Implementation Project (ARIP) has unearthed from this accord (Erdoğan ve Erdoğan, 2018).

### **2.4. Modern Agriculture**

Agricultural mechanization which creates indispensable input of the modern agricultural technique entails a resilient planning owing to pricey and long-term investments. For that reason, issues and agricultural mechanization condition should be pondered in terms of regional and territorial. Agricultural mechanization level situation of our country is above world average but it is lower than developed nations (Eryılmaz et al, 2013).

Agricultural enterprises aren't adequately large in Turkey. These entities are really weak in terms of capital accumulation. That's why investments haven't been able to be carried out in the expected level. At the same time, modern agricultural technologies and agricultural inputs haven't also been pervaded. It is conditional to

organize conveniently in order to utilize from public services productively. Moreover, agricultural enterprises that embark on the output potentials can utilize factors of the production, practice of the modern agricultural technologies and sales of the product marketing better in a more efficient and productive way. It is also related to inhabitants who live in the rustic land (Alçiçek ve Karlı, 2016).

## **2.5.Organic Agriculture**

Significance of the agricultural output is known in point of prospects of the consumer and human health as well as effect about issue of environmental and natural assets. One of the production methods which considers environment and human health is organic agriculture. Organic agriculture is genuinely an output framework to human health and environment toward reconstitution of the natural balance which disrupts in the aftermath of wrong practices in the ecological configuration (Çobanoğlu ve Işın, 2009).

Organic agriculture is a sphere which sees intense interest and is diffused in a rapid way all around the world. Additionally, market of the global organic agricultural products flourishes stage by stage. Organic and sustainable agricultural practices are a notable configuration in the recent agenda of world (Arslan ve Akhan, 2018).

External agricultural inputs scarcely get utilized in the organic agriculture. However, it is an alternative agrarian framework which mostly comprises biological density. Organic agriculture submits the pathways of elevating to the most opportune level in accordance with social needs of the territory and local environmental conditions about fecundity of the agricultural ecosystem. On the other part, it suggests the ways of utilizing synergy and interaction which occurs between people, animals, products and land. Organic agricultural products don't have a marketing chance after production stage. Sorts that are demanded by householders get produced under the particular conditions with respect to amount of the demand. As the outcome of this system, demand which is in the buyer's market specifies purchasing potential in the domestic market, export and production of the organic agricultural products (Sarıkaya, 2007).

Organic agriculture is a paradigm which integrates sustainable agricultural output framework in point of economic, humanitarian and environmental. According

to overseas countries, this method having environmental conservation goals is denominated as ecological agriculture, biological agriculture, biodynamic agriculture, alternative agriculture, renewable agriculture or sustainable agriculture (Bayram et al., 2007).

Organic agriculture is essentially a production system which intends to boost quality of the product along with inhibition of the chemical pesticides and fertilizer utilization as well as increase of the production, green fertilizer, alternation, conservation of the soil, raising stamina of the plant and utilizing from biological struggle. That's why organized producers, consumers and states which had high income level have begun to prefer to consume and produce the products that don't poison people and nature. It is significant to prefer organic agricultural methods of the agricultural growers with creation of the propitious situations. It commonly depends on the continuation of convenient conditions for cultivators choosing delicate production frameworks (Çobanoğlu ve Işın, 2009).

90% of the organic product cultivation is carried out by advancing nations and introduced to overseas markets. Advanced nations are mostly in the position of buyer of organic agricultural products. Demand of the organic agricultural products flourishes rapidly in the market of multiple countries worldwide (Inci et al, 2016).

Organic agricultural development researches which separately continued till 1970 has attained a different dimension with founding of International Federation of Organic Agriculture Movement (IFOAM). International Federation of Organic Agriculture Movement which was formed by 5 founder organizations from 3 continents is located in Tholey/Theley-Germany as a central place. The essential goal of this organization is to gather ecological agricultural movements under a roof in the whole globe by leading advancement of the movement fairly. In other words, it intends to transfer all developments to fellows and ranchers by formulating regulations and primary standards (Sarıkaya, 2007).

International Federation of Organic Agriculture Movement is an establishment which works for diffusion of the organic agriculture. It delivers the information and support to enterprises that operate for this intention. Research Institute of Organic Agriculture (RIOA) contributes to enhancement of the international organic agriculture by conducting organic agricultural researches. IFOAM has carried out

activity as of 1972. RIOA has launched the scopes as from 1973. The general goals of these entities are to galvanize the world to get closer to acceptance of the organic agriculture along with endeavours about issue of organic agriculture (Çelikyürek ve Karakuş, 2018).

### **2.5.1. Dispersion of Organic Agriculture in Turkey**

Turkey is a nation which has favourable circumstances for organic agricultural feasibilities in point of workforce, product variety, climate, water assets and soil. As it happened in the whole globe, growers have created an output land in order to optimize their income harmoniously with nature toward demands of the consumers via organic agriculture in Turkey as well (Dalbeyler ve Işın, 2017).

There are 1463 corporations which embark on the activity in the organic agriculture in Turkey according to data of Ministry of Agriculture and Forestry of Turkish Republic. In particular, required workforce is considerably low-cost in the organic agriculture in Turkey that is in the status of a thriving country when it gets compared to other developed states. It takes a significant competitive advantage to our country in this sector. It converts the products that are produced in Turkey into a preferable place. Furthermore, Turkey has unpolluted organic agricultural estates due to convenience of the climate conditions. Therefore, dominance of Turkey shouldn't be neglected concerning production of the organic product (Bilgen, 2017).

Organic agricultural production activities have begun to be actualized toward demands of the foreign firms which carried out scopes in Europe during periods of 1984-1985. Besides, introducing this production technique has been incorporated into this research. In 1985, 8 genres of crops have been cultivated in Aegean Sea Territory. A rapid progress has been made in this domain after legal regulation which was upheld in 1994. Then, organic agricultural production which started with significant traditional export products (dry grape, dry fig and dry apricot) of Turkey has been pervaded to other regions along with hazelnut and cotton. 203 different kinds of crops have been produced within organic farming in 2006. Organic agricultural activities which began in Turkey haven't reached in the result of demands of consumers to these crops like advanced nations. It has begun according to demands of the consumers like developed countries. Major purpose is to boost export rate in the essential agricultural

products of Turkey and penetrate into the markets. Spectrum of the organic product of Turkey has pointed out upturn for both export and output within the years. In other words, Association of Ecological Agriculture Organization (AEAO) has been established in 1992 in Izmir with the goal of mobilizing organic agriculture movement regularly in Turkey. Producer, exporter, consumer, researcher and ones who are interested in this domain take part between fellows of this association. Association conducts multiple conventions, education and publication activities in the organic agricultural segment as of 1992 (Ataseven ve Güneş, 2008).

Amount of demand augments step by step in the globe and Turkey concerning organic products. Considerable changes seem about options of the reliable foods in the consumer demands in recent years. Consumer wants to make sure that desirable product which is produced in this method is convenient and safe in accordance with human health. Also, consumer mostly prefers these genres of products. When organic production data was scrutinized, number of the producer was 14,798 in 2003. This rate has reached 54.635.000 producers in 2012. In addition, organic agricultural lands have boosted from 113.621.000 hectares to 702.909.000 hectares. Then, it has been revealed that yield of the organic products reached 2.217.055 tonnes (Ilgar, 2017).

When territories and regions that embarked on the organic agricultural activities were scrutinized, Eastern Anatolian Region has seemed at the pinnacle with 66,2% in accordance with data of 2010. Aegean Sea Territory has respectively followed with 12,4%. South Eastern Anatolian Region is at the third standing with 8,8%. Central Anatolian Territory is at the forth place with 5,4%. Black Sea Region (BSR) has 4,2%. Mediterranean Region (MR) has 1.8% despite greenhouse cultivation feasibilities. Marmara Region (MR) is at the last position with 1.2% in the organic agricultural scopes (Merdan ve Kaya, 2013).

Organic agriculture has begun to be pervaded in recent years in Turkey. Reason of rising demand of organic agriculture and product has created trenchant information sources for farmer educations, official institutions, private sphere enterprises, written and visual press. Raising conscious consumer has caused formation of the organic markets along with impetus of the organic production through information sources. At the same time, it contributed to diffusion of the organic agriculture (Torun, 2011).

The most significant concept which needs to be accentuated in the organic agriculture is sustainability. Ecological drawbacks transmute into death-survival for people who utilize these assets like erosion, infertility of the prairies, disruption and alleviation of the water resources in the geography of Turkey. Revitalization of the organic agriculture has primarily begun to thrive with demands of the exporter. First large market formation initiative has been launched by a non-governmental organization about organic agricultural affair with opening of the stores that sold organic products during 1998-2000. Hence, it has shown the development from climax to decline along with buyers. It hasn't taken place via base by producers to the contrary of European countries. Then, it has continued with formation of its markets of the exporter enterprises by moving unaffiliatedly from impoter firms. Organic farming has gained an acceleration with encouraging consumer and introduction of overseas importer companies from zenith to decline in Turkey by making a progress without wrecking natural structure of the environment and cultivating wholesome food in all advanced nations (Ilgar, 2017).

On the other part, it can be revealed that Turkey has favourable properties in terms of organic agriculture when advancement level of the traditional agriculture was minded as well as climate conditions and natural structure of Turkey. It specifies that Turkey is more advantageous according to western nations in terms of production that is described as oneself organic within this context (Merdan ve Kaya, 2013).

Standards of Turkish organic agriculture are commonly compatible with international standards at this point. It has obtained a structure which offers credible foods to consumers along with profit yield of the producers (Merdan ve Kaya, 2013).

Turkey is one of the amazing instances when it gets reviewed to developing countries with respect to export amount of the organic agriculture. Almost, all of the products which get yielded organically get exported to the abroad. Consumption of the organic products soars each passing day in the domestic market. Turkey has abundantly proper ecological conditions, high quality products and raising export potential in the way of organic cultivation (Arslan ve Akhan, 2018).

**Table 7: Organic Crop Production**

Year	Number of Crops	Production Tonnes
2005	205	421 934
2006	203	458 095
2007	201	568 128
2008	247	530 224
2009	212	983 715
2010	216	1 343 737
2011	225	1 659 543
2012	204	1 750 127
2013	213	1 620 387
2014	208	1 642 235
2015	197	1 829 291
2016	238	2 473 600
2017	214	2 406 606
2018	213	2 371 612

**Source:** Turkish Statistical Institute 2019<sup>19</sup>

In accordance with table 7, number of crops and production tonnes of Turkey have been indicated as part of organic crop production.

Number of crop which was produced in the organic production is 205 in 2005. Also, it has reached the pinnacle with highest amount in 2008. Although crop rate of the organic production diminished in 2009, it has kept raising in the next periods. The lowest rate has occurred with 197 crops in 2015. Then, a steady upswing has continued as of 2016 with 238 crops.

As for production tonnes, there is entirely a stable upturn year by year. It is far more steady than crop rate. Especially, a rapid rise had occurred between period 2008-2010 in the production amount. Even if it underwent a tiny downswing in 2013, this rate has kept boosting till 2 371 612 tonnes in 2018.

As a result, it has revealed that Turkey made prodigious progresses concerning organic agricultural activities each passing year. Rises in the amount of crops and production tonnes are really considerable for the growth of organic agricultural

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<sup>19</sup> <http://www.tuik.gov.tr/UstMenu.do?metod=temelist> ; accessed July 2019.

production. As long as it perpetuates its output potentials, it will keep flourishing organic agricultural structure in a consistent way.

### **2.5.2.Organic Fertilizer**

Biological structure of the land, protection of the liveliness and facilitation of the sustainability are basic requirement for soil abundance in the organic agriculture. It is mandatory to utilize some land providers and organic fertilizer with aim of facilitating this method. Production and utilization of organic fertilizers raise each passing day. Organic fertilizers facilitate permanence of the soil fecundity. On the other hand, it ameliorates physical, chemical and biological properties owing to including organic substance, microorganisms and plant nutrition substances (Tunalı et al., 2016).

Low organic substance levels substantially affect plenitude in the agriculture within conditions of Turkey. Organic substances are influential on the quality as inorganic nutrition substances with this intention. Utilizing organic fertilizers is the most effective method along with chemical fertilizers in the rise of fertility. Competition of the organic fertilizers is substantial in the increase of quality and abundance in the cultivation. In particular, the most ideal lands that herbs prefer are abundant areas with organic substances in the vegetable cultivation (Kılıç ve Sönmez, 2019).

Organic fertilizers retain plant nutrition substances in its structure within organic combinations. In Turkey, register certificated organic fertilizer production has firstly begun as part of organic fertilizer legislation in 2003. Number of organic fertilizer which was confirmed by register certificate was 214 in 2003. This number has been 587 by scaling up in 2009 (Demirtaş et al., 2012).

### **2.6.South Eastern Anatolian Project**

South Eastern Anatolian Project which gained a multidimensional qualification has been unveiled with the aim of mobilizing water and prosperous land resources as an energy and irrigation project. Especially, it was thought that there would be immense changes in each area of the region with implementation of the irrigation

project. It was intended to be carried out and planned harmoniously with each other as from time and place of developments in the different spheres to be purchased with lowest cost from the highest benefit of expected project. Agriculture is the most significant extent of South Eastern Anatolian Project which originated from operating idea of water and land resources rationally. As part of framework of SEAP, agricultural expansion goals are to augment income level in the rural area and supply the input for zonal industry. Moreover, any other aims of SEAP are to facilitate employment potentials by minimizing immigration from rural to urban and boosting output toward export. On the other part, income level of the territory will be maximized to fivefold in the high agriculture and industrial potential with completion of the irrigation campaigns with respect to expectations. Local community that will reach 9-10 million population streamline job possibilities to nearly 3-5 million households. Master Plan of SEAP predicts that region is becoming export center which is based on the agriculture. At this point, condensation of the private segment investments, evaluation of the industrial and service sphere get intended by potentials for delivery of the industrial development. Accordingly, projects get unveiled toward facilitation of the private segment contributions as part of South Eastern Anatolia Project as well as implementation of the industrial infrastructure projects (Ökten ve Çeken, 2008).

Master Plan of South Eastern Anatolia Project which specified paradigm of the territorial revitalization has especially accredited growth of the water and land assets to the calendar by pondering financial and technical volumes. Besides, it has considered in the economic and social spheres of changes that it would warn development and employment creation. In the same manner, it has facilitated probable distribution of rural-urban section with majority of the population. On the other hand, residential and urban infrastructure requirements have been determined in the macro level by educational and medical utilities. Hence, it propounded financial need in accordance with years (Benek, 2009).

South Eastern Anatolian Project is one of the largest breakthroughs along with measurement, dimension and intentions between advancement projects worldwide. Master Plan (MP) has transmuted South Eastern Anatolian Project into a regional development programme which comprises socio-economic dimensions as well with revitalizations in the basic sections of economy. At the same time, master plan has

determined the integrated regional development extents and framework (Toprak, 2010).

South Eastern Anatolian Territory which possesses significant water requirements has terrestrial climate properties. Also, it is a region that sees a lower precipitation rate in accordance with other territories. Accordingly, it is compulsory to satisfy inadequate areas of the region by irrigation for implementation of the agricultural output in the territory. Furthermore, boosting world population and limited land assets enable enhancement of the agricultural output. At the same time, it transmutes land reserves into fertile condition. It is available with advanced agricultural technologies and irrigated farming. It has been determined how these two substantial tributaries were evaluated for our country in point of this method. In 1980, Euphrates and Tigris Catchment Area Projects have been denominated as South Eastern Anatolian Project. Groundwork of Atatürk Dam which was laid in 1983 has begun to be actualized along with South Eastern Anatolian Project that encompasses welfare and advancement project (Sepetçioğlu et al., 2010).

Tigris and Euphrates Rivers generate 28% of total water potential of Turkey. 20% of irrigable area is economically in South Eastern Anatolia Project Region of Turkey. Approximately 42% of territory lands get utilized for agricultural purposes. 54% of this area is in the irrigable circumstance. When South Eastern Anatolian Project gets completed, 28% of total water potential of Turkey will be taken under the control with installations on Euphrates and Tigris Rivers which flow more than 50 billion cubic metres in one year. Also, this area will be irrigated above 1,7 million hectares and fourfold of Çukurova. With completion of this campaign, an equal area will have been opened to irrigation land thus far by government effort in Turkey (Toprak, 2010).

As a consequence, South Eastern Anatolia Project is really significant for Turkey and region. South Eastern Anatolian Territory which is designated as the most underdeveloped region of Turkey get observed differently before and after SEAP when socio-economic condition gets minded. Region has made the progresses in the multiple segments through SEAP. At the same time, it can be told that South Eastern Anatolia Project has crucial contributions to advancement of territory, income rise, mitigation of destitution, upsurge of the welfare and living standards (Çelik, 2016).

## **2.7.Utilization of the Domestic Seed in Agricultural Estates**

Seed is in a momentous place within botanical production inputs. Quality of the seed also directly affects amount of the output as climate, water, fertilizer and other requirements (Dumanođlu ve akmak, 2018).

Turkey has opportune aspects in point of seed cultivation. It is a candidate country to becoming the center of seed cultivation in terms of possession of the insect potential worldwide. Also, it includes temperature, illumination time, light intensity, precipitation, rational moisture and climatic parameters (Őahin et al., 2012).

When general situation of seed industry of Turkey gets evaluated, seeding segment has seed production potential to satisfy demands of the rancher, industrialist and consumer. At the same time, it has capacity of yielding seed and marketing scope. Planned and methodical seed activities have begun with founding of research institutes and seed breeding centres between period 1925-1930 along with republic in the agriculture of Turkey. In particular, a new period has begun with promulgation of 308 issue law about registration of the seed, control and certification in 1963 in Turkish seed. Ministry of agriculture has undertaken duties first time about market audit, quality control with type of the registration and certification of seeds along with this ordinance. Additionally, it has taken on a more influential role about seed production issue. Public-based seed policies which were formulated in Turkey till 1980s have been in the intention of satisfying requirements of the country with domestic productions. Private sector seed growing has grabbed the expansion opportunity with activation of free market economy, liberation of the seed prices and import in 1984. Private segment entrepreneurship has been organized in the situation that will involve seed yield, technological transfer, sort advancement, seed operating and marketing affairs. Seed growing policies which were implemented during period 1984-1985 have delivered a potential to private enterprises which carried out activity in the segment about rapid increase. Seed production and distribution system that showed a structuring with dominance of the public sector previously has delivered foremost private sphere scopes (Bađcı ve Yılmaz, 2016).

## CHAPTER THREE

### 3.LITERATURE REVIEW ABOUT AGRICULTURAL ECONOMY

In this excerpt of the thesis, studies which were conducted regarding influence of the agriculture on Turkish economy will be scrutinized. Previous studies have been reviewed regarding agricultural economy of Turkey. Names of the thesis writers, periods, studies and models were shown below:

**Table 8:** Selected Studies As part of Literature Review

Article-Thesis Author-Year	Period	Variables	Method
Stephan R.P. Halloy/1999	1842-1990	Variable: Relative	Shannon Weaver Model
Richard Paping/2004	1830-1920	Variable: Explanatory	Kooij Model
Selim Adem Hatırlı-Burhan Özkan-Cemal Fert/2005	1975-2000	Variables: Input and Dependent	Cobb Douglas Functional Method
Ahmet Özçelik-Osman Orkan Özer/2006	1973-2004	Variables: Independent and dependent.	Koyck MHaodel
Hasan Dudu/2006	2002-2004	Variable: Independent and dependent	Batesse, Coelli and Broca Models.
Cameron G. Thies-Schuyler Porsche/2007	1986-2001	Variable: Dummy, independent and dependent.	Average Producer Nominal Protection Coefficient
Ali Altınır/2008	2002-2004	Variable: Independent and dependent	QML (Huber White)
Zeynep Hande Yaman/2009	1965-2005	Variable: Dummy variables	Zivot Andrews Unit Root Approach

Ali Gökhan Yücel/2012	1980-2010	Variable: Dependent and independent	Granger Causality Model
Esin Aksu/2012	2003-2011	Variable: Independent and dependent	Granger Causality Analysis
Keith O. Fuglie/2012	1961-2009	Variable: Explanatory and dependent	Cobb Douglas Production Function
Mehmet Yazıcı-M. Qamarul Islam/2012	1988-2008	Variable: Cointegrated variables	Real Trade Balance Model
Osman Orkan Özer/2013	1980-2004	Variable: Lagged, dependent and independent	Koyck Model
Osman Sedat Subaşı/2013	1990-2010	Variable: Nonstationary and stationary series.	Malmquist Total Factor Productivity Index
Öner Günçavdı-Suat Küçükçifçi-	1968-2002	Variable: Value-added and output	Leontief Production Model
Seyfettin Gürsel-Zümrüt İmamoğlu/2013	2005-2011	Variable: Dependent	A similar model to Matsuyama
Zeynep Aktaş Koral/2013	1962-2010	Variable: Stationary variables were ascertained.	Gravity Models
Altuğ Özden/2014	1992-2012	Variable: Input	Malmquist Model
Ayşe Esra Peker/2014	1994-2011	Variable: Macroeconomic variables	Dynamic Ordinary Least Square and Full Modified Ordinary Least Square
Mustafa Terin-Irfan Okan Güler-Adem Aksoy/2014	1995-2012	Variable: Stationary	Granger Causality Analysis
Nezahat Doğan/2016	1968-2010	Variable: Non-stationary	ARDL (AutoRegressive Distributed Lag)
Büşra Temur/2017	1985-2016	Variable: Non-stationary and stationary	ARDL (AutoRegressive Distributed Lag)
Öznur Özel/2018	1980-2016	Variable: Explanatory	Zivot-Andrews unit root test. Toda and Yamamoto Causality Tests (1995)
Simay Kızılkaya/2019	1961-2015	Variable: Explanatory	Malmquist TFP (Total Factor Productivity) Change Method

Stephan R.P. Halloy (1999) The Dynamic Contribution of New Crops to Agricultural Economy: Is it predictable; plants that were cultivated in the agricultural fields have been evaluated in the agriculture of New Zealand. Abundance of the crops has been analyzed in a detailed way. Relative variables have been pinpointed.

Richard Paping (2004) Family Strategies concerning migration and occupations of children in a market-oriented agricultural economy; clay Soil Regions of Groningen were analyzed in the agricultural economy of Netherlands. Explanatory variables have been used.

Selim Adem Hatırlı, Burhan Özkan and Cemal Fert (2005) An econometric analysis of energy input-output in Turkish agriculture; Estimated physical energy input, quantities and energy values of fertilizer and energy input and output values in Turkish agriculture were analyzed about this issue. Input and dependent variables have been picked out.

Ahmet Özçelik and Osman Orkan Özer (2006) Analysis of Correlation of Wheat Production and Prices with Koyck Models in Turkey; wheat price and wheat cultivation have been reviewed in this period. Data were pointed out about annual variables. Independent and dependent variables have been selected.

Hasan Dudu (2006) Efficiency in Turkish Agriculture: A Farm Household Level Analysis; A farm household survey has been carried out between period 2002-2004. The goal is to assess the influence of agricultural reform program. Independent and dependent variables have been chosen.

Cameron G. Thies-Schuyler Porsche (2007) Political Economy of Agricultural Protection of 30 overseas countries has been assessed. Dummy, independent and dependent variables have been utilized.

Ali Altınar (2008) Interaction between financial structure of the rural households, agricultural support and agricultural investment: An application for Turkey with micro level data; a survey has been conducted regarding income circumstances of agrarian households. Demographic, economic and social dimensions have been evaluated as part of this empirical study. Determinants affecting agricultural

investment decisions and investment amount have been emerged. Independent and dependent variables have been identified in the end of this study.

Zeynep Hande Yaman (2009) Structural Transformation of Agricultural Products and Agriculture of Turkey within European Union Process: Econometric Analysis; as part of unit root test method, wheat, cotton, meat, hazelnut, tobacco, soybean, lentil, milk, sugar beet, maize and sunflower production series have been identified. Dummy variables have been used.

Ali Gökhan Yücel (2012) Seeding and Production Relationship in the Agricultural Sector: A practice on Turkish agricultural sector; wheat and barley amounts that were used within this period were calculated. Prices of wheat and barley were also denoted. Wheat and barley prices have been obtained as nominal type. Independent and dependent variables have been specified.

Esin Aksu (2012) Causality Analysis of agricultural credits and agriculture sector between 2003-2011; agricultural credits have been assessed by agricultural credit, agrarian employment, agricultural export and agricultural amongst some macroeconomic variables on Turkish economy. Especially, agricultural output and export have been reckoned as monetary variables. It was considered within quarter period. Independent and dependent variables have been utilized.

Keith O. Fuglie (2012) Productivity Growth and Technology Capital in Global Agricultural Economy; Total factor productivity of agricultural outputs and inputs has been computed. Explanatory and dependent variables have been ascertained.

Mehmet Yazıcı-M. Qamarul Islam (2012) Exchange Rate and Turkish Agricultural Trade Balance with EU; Turkish agricultural exports and imports from EU were scrutinized. Also, agriculture trade weighted EU real income were examined. Turkey's Real Income over time, agriculture trade weighted real effective exchange rate of Turkey with EU and Turkish Real Agriculture Trade Balance with EU were also studied between these terms. Cointegrated variables appeared in the results of the test.

Osman Sedat Subaşı (2013) The Relationship Between agricultural research development extension policies and agricultural growth in Turkey; technical efficiency indexes, technical efficiency changes, technological change and change index of total

factor productivity have been calculated. Changes have been observed in the total factor productivity. It has propounded differences within this empirical study. Non-stationary and stationary series have been shown.

Öner Günçavdı, Suat Küçükçifçi and Ayşe Aylin Bayar (2013) Economic Development and Structural Change: Role of the Agricultural Sector in Turkey; supply and demand constraints have been calculated in agricultural sector during period 1968-2002. Output and value-added variables have been specified.

Seyfettin Gürsel-Zümrüt Imamoğlu (2013) Why is agricultural employment increasing in Turkey; Agricultural employment has been examined by gender and age. Also, average changes have been assessed regarding agricultural employment, level and share between these years. Dependent variables have been indicated.

Zeynep Aktaş Koral (2013) Impacts of Agricultural Supports on Exports of Individual Agricultural Commodities in Turkey; export rates of 18 agricultural commodities of Turkey have been examined along with 72 countries. Yearly average has been taken. Stationary variables have been ascertained.

Altuğ Özden (2014) Total Factor Productivity Growth in Turkish Agriculture: 1992-2012; total factor productivity growth has been analyzed on Turkish Agriculture during these periods. Input variables have been spotted.

Ayşe Esra Peker (2014) Production Structure of Agricultural Sector and Comparative competition power in Turkish Economy; exchange rate, inflation, interest and money supply have been evaluated by macroeconomic variables in the theory. Macroeconomic variables have been pointed out.

Mustafa Terin, Irfan Okan Güler and Adem Aksoy (2014) Causal Relationship Between Agricultural Production and Agricultural Credit Use in Turkey Study; Real Agricultural Output Value and Agricultural Credit Use were denoted in Turkey between these periods. Stationary variables have been denoted.

Nezahat Doğan (2016) Agriculture and Environmental Kuznets Curves in the case of Turkey: Evidence from ARDL and Bounds Test; Environmental pollution and economic growth is scrutinized in the agricultural domain of Turkey. Kuznet Curve measured environmental pollution and economic growth. Long-run impact of

agricultural domain of Turkey has been analyzed on CO<sub>2</sub> emission level. Stationary variables seemed appropriate. However, dependent variable is proper in ARDL model.

Büşra Temur (2017) Impact of Global Warming on Agricultural Sector in Turkey; there was a research about agricultural gross domestic product between period 1985-2016. Average temperature variables, total carbondioxide, total precipitation, wheat, rice plant and corn production data have been used. Gross domestic product has been evaluated on climate change. Non-stationary and stationary variables have been indicated.

Öznur Özel (2018) Impact of financial incentives provided to agricultural sector on agricultural sphere development; long-term relationship and causality have been examined on the reinvigoration of agricultural segment. Financial incentives were granted to agrarian sector of Turkey during period 1980-2016. Explanatory variables have been utilized in this empirical study.

Simay Kızılkaya (2019) Agricultural Productivity Change in Turkey; agricultural productivity change of Turkey was compared to Brazil, Spain and Mexico. Total output growth rate, total input annual growth rate, agricultural labor force participation, total livestock capital on farms were appraised on this topic. Explanatory variables have been preferred.

Although there are so many studies concerning impact of the agricultural sector on development of Turkish Economy, there was no such a study which was conducted about gross domestic product, consumer price index, import and export of agrarian segment on Turkish Economy during this period. It is definitely first study which was carried out on this issue. Granger Causality Method will be utilized as part of causality analysis with this intention. Difference of this empirical study from other researches is to assess agricultural products on the export, import, GDP and consumer price index within period 2004-2019. Dependent variables have been utilized concerning GDP, consumer price index, export and import intervals as part of impact analysis. Exogenous and endogenous variables were also used within lag length analysis in order to calculate gap of export, import, GDP and consumer price index amounts.

## CHAPTER FOUR

### 4. An Empirical Study Toward Impacts Of Agricultural Sphere On Turkish Economy

#### 4.1. Intention of Research and its Significance

Aim of this research is to identify effect of the export and import which is carried out in the agricultural segment of Turkey on Turkish economy.

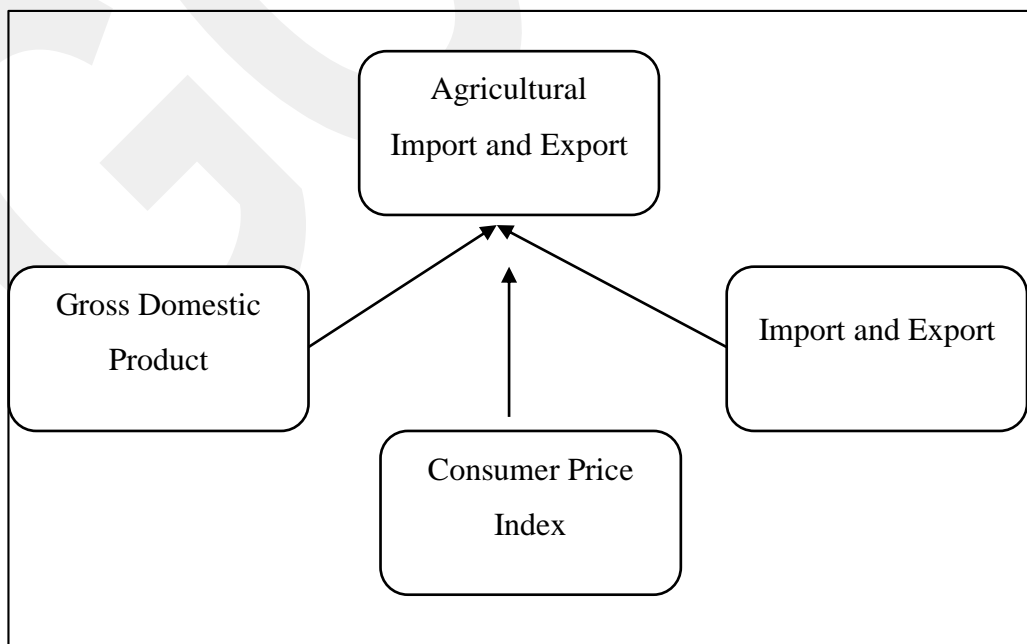
#### 4.2. Implementation Justification of the Research

This study has been conducted by goal of contributing to the literature in the development of the agricultural sector and propounding the impact of consumer price index with gross domestic product, total export and import from macroeconomic variables which were thought to be effective over agrarian sphere in Turkey.

#### 4.3. Model of the Research

Model of the research can be ascertained below:

**Figure 15:** Model of the research



#### **4.4. Scope of Research and Limits**

As part of the study, gross domestic product, export, import and consumer price index data which took place within specific years in Turkey will be deployed along with amount of export and import about agrarian sector of Turkey. Data consisted of quarter period data.

#### **4.5. Used Data in Research**

Data which were utilized in the analysis comprise period 2004-2019. Economic data have been compiled through statistics that were published by Turkish Statistical Institute.

#### **4.6. Research in Hypothesis**

Hypothesis which was tested during the research about is impact of the agrarian sphere on macroeconomics data:

H<sub>0</sub>: Import and export levels don't have an impact on economics in the agrarian segment of Turkey.

H<sub>1</sub>: Import and export levels have an effect on economics in the agricultural sector of Turkey.

H<sub>1a</sub>: Import and export levels have an impact on the import levels in the agricultural domain of Turkey.

H<sub>1b</sub>: Import and export levels have an influence on the export levels in the agrarian sphere of Turkey.

H<sub>1c</sub>: Import and export levels have an impact on the gross domestic product in Turkish farming sector.

H<sub>1d</sub>: Import and export levels have an influence on consumer price index in the agricultural sphere of Turkey.

Import and export levels have an impact on Turkish economy concerning agricultural segment. In the result of this study, negative figures have been identified. In this case, it has a meaningless consequence.

## **4.7. Research Method**

### **4.7.1. Panel Data Analysis**

Data can be split into three sections by considering time factor in the statistical data analysis. These are cross-section data, time-series data and panel data that originate from concatenation of cross-section and time-series. Cross-section data state which were gathered from multifarious units during a particular moment of time. It gets deployed in order to denote economic units like country, sphere, household, entity and individual. For instance, it is like either motorvehicle number is in accordance with counties of Istanbul on july of 2015 or total tourist number who visited each country of OECD in 2016. As for time-series data, data which indicate value according to time scale like hour, day, month, year and season of specific variable data seem. For example, it is like annual import, monthly export and daily gold returns. Other considerable data sort is panel data. If data that belong to identical data get monitored within time, name of these types of data is panel data. Panel data can be defined as two-dimensional data totality which occurs with collation of data. It encompasses cross-series in number N (Individuals, households, firms, countries) and time serie in number T (annual, month and daily) (Tatoğlu, 2013, p.25).

Panel data subsumes observations which are regularly recurred on the same country, company and person. As panel data can be created by surverys which are conducted about person and households, it can be created by collating multifarious economic and social indicators of the corporations and countries in accordance with particular years. For example, panel data is prevalently created by various indicators which point out economic, social and educational variables belonging to OECD nations by combining some annual and monthly data. Panel data method has commonly begun to be thrived and grab the attention during 1960s. It keeps building up nowadays. Additionally, diverse methods get formulated regarding this approach. Panel data models compositionally get examined under two general headings as static and dynamic model in the basis. In the static models, existing dynamic structure doesn't get minded among the parameters. However, dynamic structure gets considered between dependent and uncommitted variables in the dynamic panel data models. Particularly, panel model data analysis frequently gets deployed in recent times. One of the most significant justifications of this paradigm is substantial contribution to increase of datasets that will create additional panel data to

enhancement of package program and computer technologies about carrying out analysis of the complex structure (Baltađi, 2001, p.5).

There are some concepts which are utilized in the panel data. Balanced panel means panel data that possesses time observation (T) in the identical number for each individual. In the balance panel data, there is no an insufficient observation which reacts for each unit. In the unbalanced panel, there are different time observations ( $T_i$ ) for each individual. There are some inadequate points in the observation points which react to units in the unbalanced panel data. On the other hand, long and short panel data notions are the terms that frequently get utilized in the panel data. In other words, unit number (N) is larger than short number (T) in the short panel data ( $N > T$ ). In the long panel data, each individual has a long time observation. At the same time, it allows a different time serie analysis for each one. An increase gets ensured in the number of observation due to usage of both cross-section and time serie data because of utilization of the panel data. It will yield increase in degree of the freedom. Thus, rectilinear connection problem which was observed in the multivariate analysis will importantly dwindle. Therewith some assumptions that were brought into panel data analysis will boost credibility of the parameter forecasts with reduction of the constraints (Matyas ve Sevestre, 1996, p.30).

#### 4.7.1.1. Strong and Weak Attributes of Panel Data Analysis

Deploying panel data comprise multifarious advantages with respect to other two data sorts instead of econometric analysis, cross-section and time-series data. Strong ways of panel data can be concatenated in that way;

- Panel data streamlines possibility in order to be analyzed multifarious economic problems that cannot be uncovered by time serie and cross-section data. In other saying, some variables and facts which are stated by horizontal sectional-extension data entail panel data. It cannot commonly be stated by a momentous and specific time measurement. For instance, analyses of classic output models are classified in accordance with degrees of economics. However, it is insufficient to unearth technological changes. It can conduct the analysis of more comprehensive models by utilizing panel data.

- In the panel data, time series and cross-series data offer the scope to be operated by data and observation in accordance with other data sorts. It simultaneously get utilized with each other.

- Both cross-section and time-series data get utilized due to usage of panel data. Thus, there will be an increase in the number of observations. At the same time, it will yield upsurge in degrees of freedom. Hence, multicollinearity which is observed in the multivariate analysis boosts credibility and efficiency by diminishing the problem substantially. For instance, some unaffiliated variables can be with lagged values within multicollinerity in the distributed lagged models. When interdivisional differences get inserted into relevant model among uncommitted models in these sorts of models by deploying panel data, it ameliorates a large stage of this problem of multicollinerity.

- Units that get utilized for econometric analyses mostly indicate heterogenic attribute. On the other hand, cross-section and time-series analyses cannot take this heterogeneity under the control but panel data consider this heterogeneity. Therefore, as interdivisional differences denote cross-sectional data, unit attributes can just be stated in the time-series data. Interdivisional differences can simultaneously be pointed out by unit properties in the panel data. Explicatory variables and error term are with each other in the panel data model within correlation due to excluded variables. Hence, parametre forecasts seem deviant. Impact levels of these variables decline deviations in the estimations by taking under the control with utilizing panel data. At the same time, it roundly eradicates. Because identifying the source in the correlation renders considerable information in terms of possessing coherent predictors.

- Potent results can be obtained by timewise alignment at the causal inferences in the panel data.

- Reiterated current observations are more secure than cross-section researches of the unique mobilization which belong to past.

- Utilization of the panel data enables long-term dynamic relationship to be estimated among variables.

As panel data utilization was stated along with benefits above, some constraints that disclosed these types of data usage. Weak ways get considered. These might be aligned in that way (Tatoğlu, 2013, s.27.);

-Multifarious deviations can augment error term in the panel data models because deviations that belong to cross-section and time-series data along with deviation of the panel data model as a whole state total deviation in the error margin. 3 error margins can scale up deviation due to the identical model. For this reason, error term seems deviant in the panel data model.

-One of the most fundamental problems which ensues in the panel data analysis is to collate data and sort out them in the most proper way. Especially, it is very tough to gather of diverse variables belonging to underdeveloped countries, Turkey and thriving nations. In addition, some data which were revised by values and questions that were answered owing to different reasons can prompt restraint of the data in some survey researches.

-Even though unit dimension is commonly adequate or more in the panel data, time dimension is short. It generally states the dependency due to high unit number of the asymptotic attributes. It detects tough econometric problems to tackle nonlinear panel data models.

-Change of some substantial variables cannot be available with time. It intercepts formation of the panel data.

-Change of the variables can be shrunk by measurement errors with time.

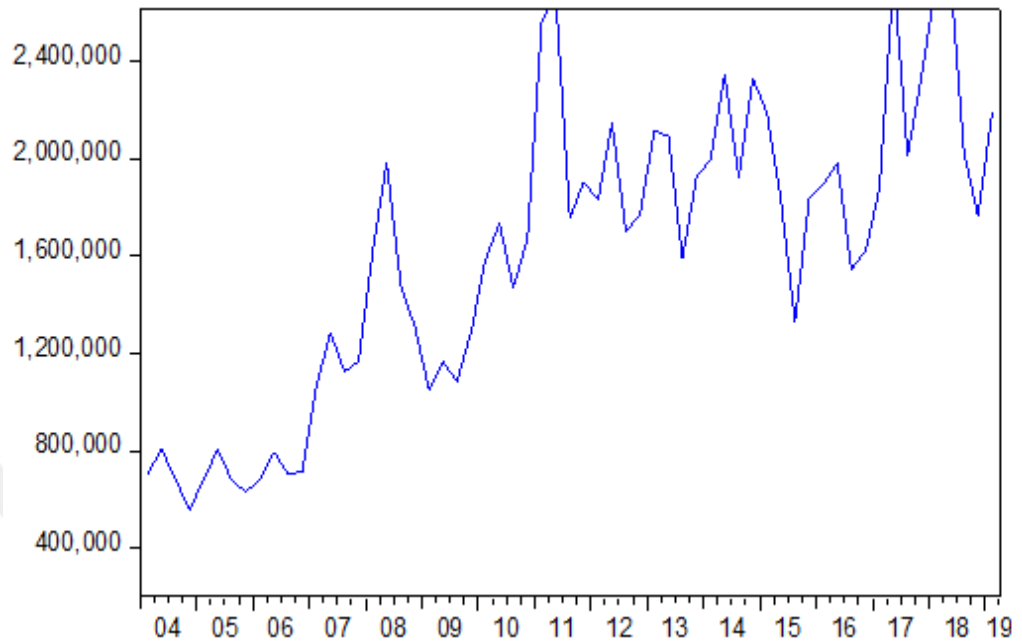
-Panel data encompasses data values which subsume framework of a constant time. However, data values which were created according to inclusion of a continuous time structure can be more dependable and informative.

-It still needs more trenchant assumptions to possess net inferences from panels because concatenating within time doesn't reflect on causality.

## 4.8. Findings

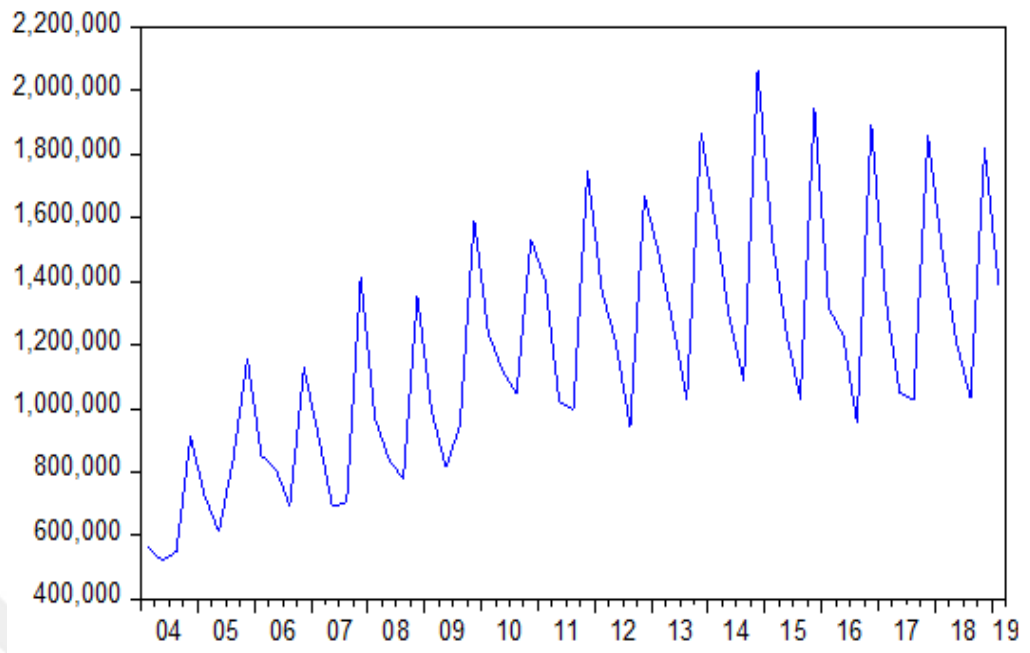
### 4.8.1.Import Levels of Agricultural Sphere

**Figure 16:** Import Levels of Agricultural Sphere



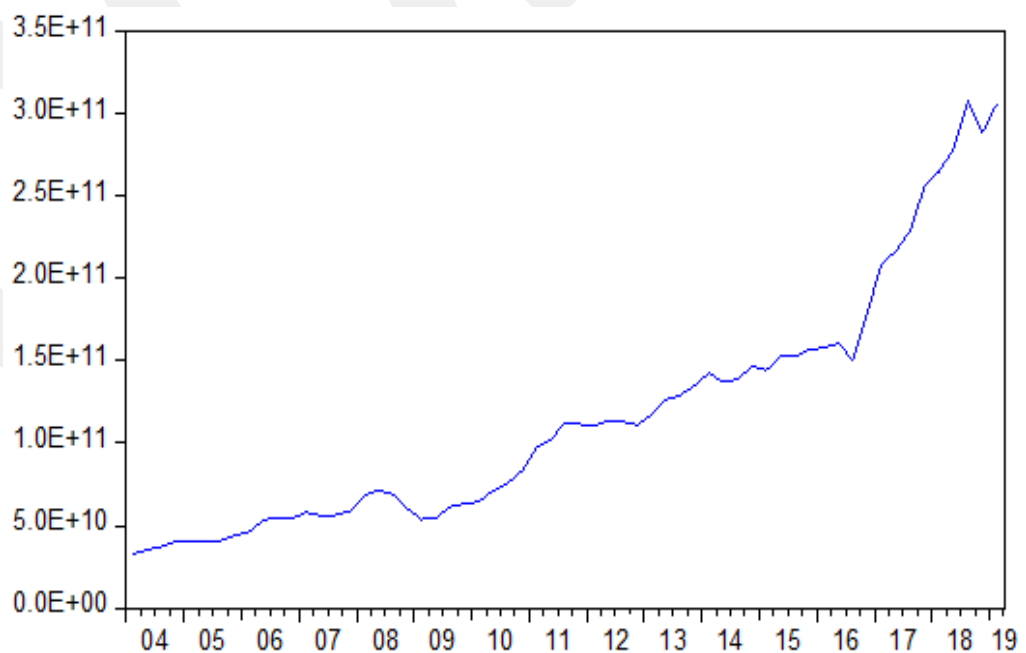
When movement of import of agricultural crops was examined during period 2004-2019, a fluctuant movement seems within the period. As 2004 and 2005 are the lowest years in the import of agricultural crops, 2011, 2017 and 2018 are the highest years concerning agricultural products. When trend gets commonly assessed, it manifests that a rise seems about dependency to abroad toward agricultural crops year by year.

**Figure 17:** Export Levels of Agricultural Segment



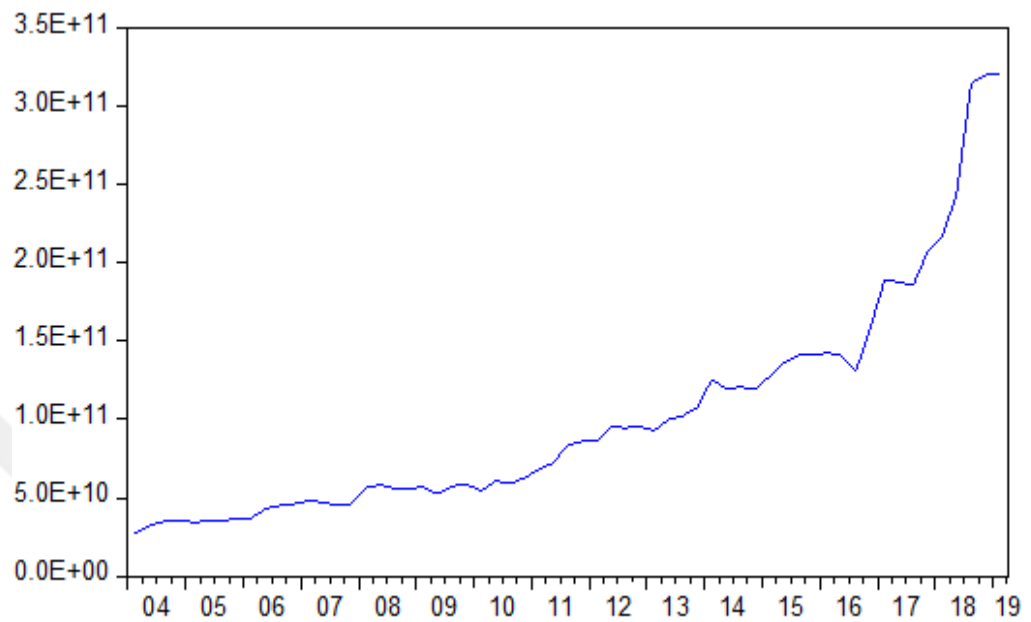
When movement of export rate of the agricultural crops gets scrutinized between year 2004-2019, a fluctuation is observed about export level. As the lowest years of export amount of agricultural crops are 2004 and 2005, 2014 is the highest year in the export of agricultural products.

**Figure 18:** Overall Import Level of Turkey



When import levels get evaluated between period 2004-2019 in Turkey, import levels that occurred in the country have a perennial uptrend. Also, it points out that this import level has boosted in the highest level nowadays.

**Figure 19:** Overall Export Level of Turkey



When export levels get checked between period 2004-2019 in Turkey, export levels which appeared countrywide generally have an uptrend. It indicates that export amount has soared in the highest year with crucial point which occurred in 2016.

#### 4.9. Unit Root Test Analysis

**Table 9:** ADF Stagnation Test with Level Values of Data

	ADF		
	Constant	Constant and Trend	None
<b>Agricultural Export</b>	-2,878141 (0,054)	-0,913059 (0,947)	2,175664 (0,992)
<b>Agricultural Import</b>	-1,930626 (0,316)	-3,088079 (0,119)	0,193373 (0,738)
<b>Gross Domestic Product</b>	-0,118348 (0,942)	-1,738007 (0,729)	4,239570 (1,000)
<b>Consumer Price Index</b>	-2,284680 (0,180)	-2,800663 (0,202)	0,843039 (0,890)
<b>Import</b>	2,718363 (1,000)	0,182030 (0,997)	5,035866 (1,000)
<b>Export</b>	1,212183 (0,997)	2,246440 (1,000)	0,043942 (0,692)

As it can appear above the table, export and import of the agricultural products don't look constant with GDP, Consumer Price Index (CPI), import and export Data in accordance with statistical consequences of ADF test in the typical levels. Data are in the constant level. Primary interval of the data has been specified due to affirmation requirement reason of the assumption.

**Table 10:** ADF Stagnation Test with Primary Interval Values of Data

	<b>Constant</b>	<b>Constant and Trend</b>	<b>None</b>
<b>Agricultural Export</b>	-32,41489 (0,000)	-34,42696 (0,000)	-4,860615 (0,000)
<b>Agricultural Import</b>	-3,618549 (0,008)	-5,237976 (0,000)	-3,533597 (0,000)
<b>Gross Domestic Product</b>	-8,148410 (0,000)	-8,066306 (0,000)	-0,911111 (0,001)
<b>Consumer Price Index</b>	-11,19610 (0,000)	-11,09425 (0,000)	-11,28466 (0,000)
<b>Import</b>	-10,53631 (0,000)	-10,85810 (0,000)	-3,774172 (0,000)
<b>Export</b>	-4,002312 (0,002)	-3,996685 (0,014)	-2,986732 (0,003)

As it was indicated on table 2, GDP, Consumer Price Index (CPI), export and import data look constant with export and import of the agricultural crops in the primary interval data with respect to statistical results of ADF test. Stagnation test has delivered such a result concerning primary gap.

**Table 11:** Impact Analysis of GDP

Dependent Variable: GAPGDP  
Method: Least Squares  
Date: 08/16/19 Time: 15:33  
Sample (adjusted): 2004Q2 2019Q1  
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.54E+09	8.15E+08	4.349709	0.0001
EXPORT IN GAP	2002.071	1906.351	1.050211	0.2981
IMPORT IN GAP	4374.018	2309.524	1.893904	0.0633
R-squared	0.081863	Mean dependent var		3.68E+09
Adjusted R-squared	0.049648	S.D. dependent var		6.46E+09
S.E. of regression	6.29E+09	Akaike info criterion		48.01223
Sum squared resid	2.26E+21	Schwarz criterion		48.11694
Log likelihood	-1437.367	Hannan-Quinn criter.		48.05319
F-statistic	2.541133	Durbin-Watson stat		1.944262
Prob(F-statistic)	0.017671			

Export and import of the agricultural products have been examined by regression analysis on Gross Domestic Product (GDP). It seems expressive ( $0,05 <$

Prob). It points out that 8,18% of GDP of import and export levels of the agricultural crops have revealed in the consequence of analysis. Within this analysis, 8,18% which was specified as an effect has been identified with impact level as part of  $R^2$ .

**Table 12:** Impact Analysis of Consumer Price Index

Dependent Variable: GAPCPI  
Method: Least Squares  
Date: 08/16/19 Time: 15:35  
Sample (adjusted): 2004Q2 2019Q1  
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.096270	0.188349	0.511124	0.6112
EXPORT IN GAP	2.27E-07	4.41E-07	0.516097	0.6078
IMPORT IN GAP	-6.87E-07	5.34E-07	-1.286968	0.2033
R-squared	0.030929	Mean dependent var		0.082338
Adjusted R-squared	-0.003074	S.D. dependent var		1.452632
S.E. of regression	1.454863	Akaike info criterion		3.636408
Sum squared resid	120.6477	Schwarz criterion		3.741125
Log likelihood	-106.0922	Hannan-Quinn criter.		3.677368
F-statistic	0.909603	Durbin-Watson stat		1.569302
Prob(F-statistic)	0.408449			

Import and export of the agricultural products have been analyzed by regression analysis on Consumer Price Index. With respect to attained results, model hasn't been assessed as meaningful because regression analysis meaningfulness value (0,05) is higher than meaningfulness level. This consequence denotes that agricultural import and export don't have an impact over consumer price index.

**Table 13:** Impact Analysis of Import

Dependent Variable: INTERVALIMPORT  
Method: Least Squares  
Date: 08/16/19 Time: 15:37  
Sample (adjusted): 2004Q2 2019Q1  
Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.46E+09	1.15E+09	3.870966	0.0003
EXPORT IN GAP	-395.1439	2692.812	-0.146740	0.8839
IMPORT IN GAP	3940.637	3262.314	1.207927	0.2321
R-squared	0.024986	Mean dependent var		4.55E+09
Adjusted R-squared	-0.009225	S.D. dependent var		8.85E+09
S.E. of regression	8.89E+09	Akaike info criterion		48.70302
Sum squared resid	4.51E+21	Schwarz criterion		48.80773
Log likelihood	-1458.091	Hannan-Quinn criter.		48.74398
F-statistic	0.730338	Durbin-Watson stat		1.856628

Prob(F-statistic) 0.486199

Impact of import and export of the agricultural products has been scrutinized by regression analysis regarding import. In reference to attained consequences, model hasn't been evaluated as meaningful because meaningfulness value of the regression analysis (0,05) is higher than meaningfulness level. This outcome points out that agricultural import and export don't have an influence on the import.

**Table 14:** Impact Analysis of Export

Dependent Variable: INTERVAEXPORT  
 Method: Least Squares  
 Date: 08/16/19 Time: 15:39  
 Sample (adjusted): 2004Q2 2019Q1  
 Included observations: 60 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.00E+09	1.51E+09	3.324152	0.0016
EXPORT IN GAP	16.86960	3521.858	0.004790	0.9962
IMPORT IN GAP	-4975.324	4266.694	-1.166084	0.2484
R-squared	0.023463	Mean dependent var		4.88E+09
Adjusted R-squared	-0.010801	S.D. dependent var		1.16E+10
S.E. of regression	1.16E+10	Akaike info criterion		49.23982
Sum squared resid	7.71E+21	Schwarz criterion		49.34454
Log likelihood	-1474.195	Hannan-Quinn criter.		49.28078
F-statistic	0.684771	Durbin-Watson stat		1.488861
Prob(F-statistic)	0.508305			

Import and export of the agricultural crops have been examined by regression analysis on the export. In accordance with obtained results, model hasn't been evaluated as meaningful because meaningfulness value of the regression analysis (0,05) is higher than meaningfulness level. This consequence indicates that agricultural export and import don't have an impact on the export.

Causality relationship of export and import levels of the agricultural products have been assessed by Granger causality between economic data of Turkey. However, it manifests that opportune lag level is in the seventh stage lag for identification of the appropriate lag length within analysis.

**Table 15: Analysis of Lag Length**

VALID Lag Order Selection Criteria  
 Endogenous variables: EXPORT IN GAP IMPORT IN GAP INTERVALIMPORT  
 INTERVALEXPORT GAPGDP GAPCPI  
 Exogenous variables: C  
 Date: 08/16/19 Time: 15:41  
 Sample: 2004Q1 2019Q1  
 Included observations: 53

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5439.707	NA	7.11e+81	205.4984	205.7214*	205.5842
1	-5387.080	91.35365	3.83e+81	204.8709	206.4323	205.4714
2	-5342.369	67.48769	2.91e+81	204.5422	207.4419	205.6573
3	-5266.187	97.74276	7.33e+80	203.0259	207.2639	204.6557
4	-5208.301	61.16262*	4.27e+80	202.2000	207.7763	204.3444
5	-5156.883	42.68668	4.07e+80	201.6182	208.5328	204.2773
6	-5088.632	41.20845	3.17e+80	200.4012	208.6541	203.5749
<b>7</b>	<b>-4966.377</b>	<b>46.13393</b>	<b>7.76e+79*</b>	<b>197.1463*</b>	<b>206.7375</b>	<b>200.8346*</b>

Granger causality analysis has been carried out for identification of the causality analysis amongst collated data in the research. Causality of export, import, gross domestic product (GDP) and consumer price index (CPI) data have been scrutinized on the import.

**Table 16: Granger Causality Analysis**

Dependent variable: GAP IN EXPORT

Excluded	Chi-sq	df	Prob.
IMPORTINGAP	9.525783	7	0.2171
INTERVALIMPORT	6.679648	7	0.4630
INTERVALEXPORT	3.575882	7	0.8271
INTERVALGDP	9.742077	7	0.2037
INTERVALCPI	9.723213	7	0.2048
All		20	---

Dependent variable: GAP IN IMPORT

Excluded	Chi-sq	df	Prob.
EXPORTINGAP	13.45751	7	0.0617
INTERVALIMPORT	11.39989	7	0.1221
<b>INTERVALEXPORT</b>	<b>19.83517</b>	<b>7</b>	<b>0.0059</b>
INTERVALGDP	9.175779	7	0.2403
INTERVALCPI	8.226877	7	0.3130
All		21	---

Dependent variable: INTERVALIMPORT

Excluded	Chi-sq	df	Prob.
EXPORTINGAP	6.619525	7	0.4695
IMPORTINGAP	5.638891	7	0.5825
INTERVALEXPORT	13.44187	7	0.0620
INTERVALGDP	13.52760	7	0.0603
INTERVALCPI	7.721581	7	0.3578
All		25	---

Dependent variable: INTERVALEXPORT

Excluded	Chi-sq	df	Prob.
EXPORTINGAP	12.02108	7	0.0999
IMPORTINGAP	9.493704	7	0.2191
<b>INTERVALIMPORT</b>	<b>19.66808</b>	<b>7</b>	<b>0.0063</b>
INTERVALGDP	12.16198	7	0.0954
INTERVALCPI	5.981744	7	0.5419
All		24	---

Dependent variable: GAPGDP

Excluded	Chi-sq	df	Prob.
EXPORTINGAP	10.72430	7	0.1511
IMPORTINGAP	10.86018	7	0.1448
INTERVALIMPORT	17.86607	7	0.0126
<b>INTERVALEXPORT</b>	<b>14.48603</b>	<b>7</b>	<b>0.0432</b>
<b>INTERVALCPI</b>	<b>23.34027</b>	<b>7</b>	<b>0.0015</b>
All		27	---

Dependent variable: GAPCPI

Excluded	Chi-sq	df	Prob.
EXPORTINGAP	0.918575	7	0.9960
IMPORTINGAP	6.968104	7	0.4322
INTERVALIMPORT	4.867391	7	0.6761
INTERVALEXPORT	7.221970	7	0.4061
INTERVALGDP	3.182588	7	0.8676

Import and export of the agricultural products have been observed between economic data of Turkey in the outcome of causality analysis. So, import of the agricultural products has been identified by import of Turkey within causality relationship.

As for empirical study, data which belong to quarter periods have been utilized during 2004-2019 in Turkey. Influence of import and export levels of the agrarian segment has been examined on the levels of GDP, consumer price index, import and export of Turkey in this study.

Import and export levels of the agricultural crops have looked fluctuant between period 2004-2019 in Turkey. All the same, 2004 and 2005 have been specified as the lowest years of import of the agricultural crops. The highest years of import have been 2011, 2017 and 2018. When the lowest years of export of the agricultural products were 2004 and 2005, 2014 has become the year which had the highest export rate in the agricultural crops.

When import levels were broadly checked between 2004-2019 in Turkey, a incessant uptrend has been observed in the import levels of nation. Also, it has risen to the highest degree. By the time export levels were checked during period 2004-2019 in Turkey, an uptrend has generally been identified in the export levels of country. Also, it has been revealed that it reached the pinnacle in 2016 with milestone.

## CONCLUSION

Agriculture is definitely one of the most indispensable and vital spheres of each country. It is backbone of the economic revitalization of a country as well as other major segments. It is one of the largest income assets for every state. Most of the nations generate their income by exporting agricultural crops to the abroad. They can easily embark on export feasibilities in order to yield immense profits from overseas sales in the agricultural segment. Hence, those countries can dwindle current deficit and loss with agrarian commerce. At the same time, agriculture is a sector which raises welfare levels of the countries.

Turkey has a lot of fecund agricultural estates but seeds which are imported from foreign countries cannot be healthy. Foreign seeds might generally include inferior-quality in the lands. It drastically damages composition of the estates. In addition, pesticides are also supposed to be imported from abroad in order to ameliorate those import seeds. It tremendously maximizes current deficit of the national economy.

Consequently, pursuing wrong policies have intercepted advancement of the agrarian sector of Turkey. With respect to outcome of this empirical research, import, export, GDP and consumer price index rates of the agricultural products have adversely influenced revival of the agricultural domain during period 2004-2019 due to wrong agricultural policies. It has indicated that 8,18% of GDP had affected import and export rates of the agricultural products toward influence of economics. This positive effect level has contributed to enhancement of overseas trade potentials toward agricultural products over gross domestic product among them.

Political proposal is to dissuade from import seed. Production of domestic seeds must be carried out in order to maximize fecundity of the agricultural fields and fostering Turkish economy. Industrial inputs (seed, fertilizer and pesticide) should be delivered to farmhands by subsidizing. Furthermore, Turkey should scale up abundance within unit meter square. With research-development of the domestic

seeds, fertility should be raised. Turkey is supposed to get rid of dependency to abroad in the fertilizer, pesticide and seed which are primary inputs of the agriculture. Besides, export soared twofold in the agriculture during last 20 years but import rate has increased twelvefold. Rise of the agricultural output is lower than population increase within last 20 years. For this reason, food deficit grows gradually. Additionally, products which are purchased at an affordable price from abroad become rival to domestic growers. Henceforth, it prompts them to sell their products to an affordable price and impoverish. Thus, Turkey can cultivate more abundant crops steadily in the agrarian sector. On the other hand, Turkey doesn't sufficiently have large agricultural enterprises. Owing to multiple small establishments, it directly hampers expansion of the agrarian segment of Turkey. That's why it cannot actualize agricultural output potentials consistently. Hence, agricultural lands cannot also be exploited abundantly. Moreover, it impinges on recovery of the subcategories such as irrigation, animal husbandry, cultivation, greenhouse, output activities and rural population.

Research, production, distribution channels and chain of credit should be formed firmly for development of the domestic seed. In other words, government is supposed to reveal delivery of the financial subsidies to ranchers one year earlier because it will take a crucial advantage to farmers in order to determine the vision about future. Thus, farmhand entirely streamlines massive investments in order to implement agricultural scopes in accordance with statements of the government. Additionally, there is an arrival complication between rural and urban areas. Commissioners and intermediary institutions receive the commission from ranchers in the consignment of products within this process. In this case, new structural reforms that will be upheld by government should indeed impede these operations.

Despite some progresses in the export and output amounts, it isn't adequate for Turkey. Turkey is really a country that couldn't adequately thrive in the agrarian segment in accordance with advanced states. One of the essential factors of this affair is related to shortcomings of the education and infrastructure system. Farmhands are supposed to be educated in the best way. For this reason, agricultural engineers who received education in the agricultural faculties of universities should be accredited to villages and rural lands by upholding the reforms in the educational system. Agricultural engineers must take courses concerning agricultural economy, agrarian trade, import and export. Moreover, they should definitely know a series of foreign

languages in order to contact accurately with overseas countries. Particularly, these engineers must have plenty of knowledge about ecological system, overseas trade, research-development programme, technological advancements and innovation. Agricultural engineers should inform ranchers about ecological framework of the fields and transfer the most proper knowledge to farmhands. Thus, ranchers and growers acquire technical production scopes and new knowledges with support of those agricultural engineers. They can receive any other ideas as well concerning technological advancement and innovation from those agricultural engineers for implementation of new agricultural compositions. Besides, there should be a resilient communication paradigm among agricultural engineers for determination of amount of crops. In this case, agricultural engineers have a lot of contributions to growth of this segment. Without a potent groundwork, this sector cannot flourish steadily in Turkey. Additionally, when developed countries exploited modern agricultural configuration, Turkey hasn't been able to adequately utilize these possibilities. With contribution of the infrastructure and quality education, this framework can be advanced. Also, agricultural mechanization has been developed. Everything has begun to be utilized by machines in the agricultural lands of advanced countries. In other words, smart farming configuration should absolutely be implemented in Turkey because smart farming is the most practical method in order to pioneer fertility of the agricultural output. Most of foreign nations have exploited smart agricultural framework with technological progresses as well as modern agriculture system and mechanization. Smart agriculture always enables requirements to utilize in the optimal level in order to possess in the maximum field from minimum area. That's why it has top-notch agricultural configuration all around the world. Herewith, with increase of the producer price index and food inflation rate, Turkey must implement structural changes and huge revision in the agrarian domain. Modern farming practices, agricultural mechanization, organic agriculture, South Eastern Anatolia Project, subsidizing agriculture, agricultural credits, utilization of the domestic seeds and founding of the agricultural cooperatives will commonly contribute to revitalization of the agriculture in Turkey.

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