

Restructuring Efforts in the Turkish Agriculture, Availability of Resources and Developments in Rural: An Overall Analysis from 2001 to 2016

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ABSTRACT: In this research, since transition to its restructuring, developments in agricultural sector were analysed with outlines. Because of the fact that this transition was in 2001, 2001 year was regarded as year of start. The reasons for the transition have been to increase the farmer registration system, subsidize the agricultural sector, and sustain the importance of the agriculture for economy. In the study, 2001-2016 period were examined, and it was observed that there were important developments in rural in 16 years. These were decrease of the agricultural areas, decline of the field farming, too much migration mobility from rural towards urban, and significantly diminishing of the rural population and the number of agricultural enterprises. Because agricultural lands were not sufficiently utilized, some crops' production potential dropped off. Even if animal products' production increased, that was not enough to satisfy the domestic demand and to export. Thus, it was determined that most of agricultural products was imported. By regression analysis, agricultural area size was estimated and it was seen that decrease of the agricultural areas could continue in the following years. In the study, some constructive proposals were also brought forward regarding improvement the agriculture and the rurals.

Keywords: Agricultural lands' usage, availability of resources, regression analysis, restructuring in agricultural sector, rural sector

Türk Tarımında Yeniden Yapılanma Çalışmaları, Kaynakların Kullanılabilirliği ve Kırsal Kesimdeki Gelişmeler: 2001'den 2016'ya Kadar Kapsamlı Bir Analiz

ÖZET: Bu çalışmada, tarımda yeniden yapılanma sürecinde tarım kesiminde görülen tüm gelişmeler ana hatlarıyla ele alınmıştır. Yeniden yapılanmaya geçiş nedeniyle, 2001 yılı çalışmada baz olarak alınmıştır. Geçişin nedenleri, çiftçi kayıt sisteminin oluşturulması, tarımın sübvansede edilmesi ve tarımın ekonomideki ağırlığının korunmasıdır. Çalışmada, 2001-2016 dönemi incelenmiş ve 16 yılda kırsal kesimde önemli gelişmeler olduğu görülmüştür. Tarım yapılabilir alanlar azalmış, tarla tarımı gerilemiş, kırsal kesimden kentlere göç hareketliliği hızlanmış ve kırsal nüfus ile tarımsal işletme sayısında önemli ölçüde düşüş yaşanmıştır. Tarım arazileri yeterince kullanılmadığından, bazı bitkisel ürünlerin üretim potansiyeli azalmıştır. Hayvansal üretimde artış görülse de, bu artış iç talebi karşılamak ve dışsatım yapmak için yeterli olmamıştır. Böylece, pek çok tarım ürününün ithal edildiği belirlenmiştir. Regresyon analizi ile gelecekte tarım alanı miktarı tahmin edilmiş ve tarım alanlarındaki düşüşün önümüzdeki yıllarda da devam edeceği görülmüştür. Çalışmada, ayrıca, tarım ve kırsal alanların iyileştirilmesine ilişkin bazı yapıcı öneriler de sunulmuştur.

Anahtar Kelimeler: Tarım arazilerinin kullanımı, kaynakların kullanılabilirliği, regresyon analizi, tarımda yeniden yapılanma, kırsal kesim

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INTRODUCTION

The history of agriculture dates back 10 000 years. Human being who was sustaining his life with hunting at that time has discovered the agriculture after a certain period. Later, they have formed societies thanks to agriculture, and founded states. Thus, agriculture has developed as an important process in the socioeconomic and cultural development in addition to people' nourishment, too. In this context, the agricultural sector should be seen as one of the fundamental sectors in the economic and social development of the countries (Doğan et al., 2015; Anonymous, 2018r).

Therefore, it is not possible for another sector to take the place of the agricultural sector. The agriculture constitutes the main field of employment of the majority of poor people in the entire world (Meijerink and Roza, 2007). In this context, as agriculture has an enormous influence on the whole society, it continues to be regarded as a vital component (Vasile et al., 2017).

The agriculture is also necessary for industrialization. It is sole way for the industrialization. For, most of the industries provide the raw material from agriculture. But, role of the agricultural sector in nations industrialized is slightly different from developing nations (Timmer, 1988). The important of the manufacturing industry for industrialized countries is a bit more than other countries.

Importance of the agriculture is indisputable for Turkey. Natural conditions, geographic and land structure of Turkey are very convenient for the agriculture. It is farmed in at least half of surface area. It has a significant share in general employment. According to data 2016, 19.5% of total employment was in the agricultural sector. Its share in total foreign trade was 8.3% and in gross domestic product was 7.4% (Anonymous, 2018a). Turkey has wide and fertile agricultural and pasture lands. That's why, it isn't possible for the agriculture to be abandoned or be neglected. Geopolitical and economic structure of Turkey gains an important advantage to agriculture.

A communique about the agricultural sector was issued by the Ministry of Agriculture and Forest on 21 June 2001 (Anonymous, 2018f). In this communique, it was aimed to constitute the farmer registration system in the rural and to subsidize directly the farmers who make agricultural production. 2 588 666 farmers were registered in 2002 following publishing of the communique. But, the number of registered farmers decreased in following years and happened 2 267 176 in 2016 (Anonymous, 2018s).

Since restructuring of the agriculture, there have happened significant developments in sector. In order to be able to see whether these developments in the agricultural sector have reached their goal, the data in this period should be known and followed (Yılmaz et al., 2006). In this study, developments for period 2001-2016 were analysed.

This study, which is original, is important in terms of shedding light on future studies and making a decision for agricultural investments.

MATERIALS AND METHODS

In this study, secondary data were used. Those were data of the government agencies (the Turkish Statistical Institute, the Ministry of Agriculture and Forest, and Food and Agriculture Organization-FAO).

In the study, the data for period 2001-2016 were examined with a view to determine availability of resources, and developments in agricultural sector. In the same period, total agricultural area and its usage, the number of rural population and agricultural enterprise, agriculture's share in total employment, agriculture's share in total gross domestic product, agriculture's share in total foreign trade, developments in vegetal product' production and animal products' production were revealed.

The change of the production amount was examined, and its effect on foreign trade was discussed. In consequence of these developments, it was suggested what to do. In the study, also some agricultural data of Turkey and the Netherland were examined, and compared.

For analysis of data, it was benefited from Microsoft Excel Program. The data were arranged in accordance with the purpose, and tables and figures were consisted, and commented. They were compared by using descriptive statistics. Total agricultural area of following years was calculated and estimated by regression model. Regression model was given in Equality 1, 2, 3 (Gürsakal, 2000; Şimşek, 2002):

$$Y = a + bX \quad (1)$$

$$\sum Y = n \cdot a + b \cdot \sum X \quad (2)$$

$$\sum XY = a \cdot \sum X + b \cdot \sum X^2 \quad (3)$$

In regression model, a and b shows the regression coefficient, X the independent variable (year) and Y the dependent variable (total agricultural area).

RESULTS AND DISCUSSION

Developments in Agricultural Area

Agricultural land is one of the five basic agricultural production factors, and is the environments which production is made on itself (Açıl ve Demirci, 1984). Since it is the fundamental factor in the supply of nutrient requirement, it has to be protected.

According to data 2001, total agricultural area of Turkey was 40 967 475 hectare, and 23 740 022 hectare of it was cultivated (Anonymous, 2018b). 22 830 717 hectare of the area cultivated was the field land. In the last 15 years, total agricultural area was decreased by 6.31%, total cultivated land by 13.90% and total field land by 14.04% (Table 1). In examined period, it is seen there was increase in area that was cultivated fruit only. The area that was cultivated fruit increased by 38.78%. Whereas, total field land decreased by 14.04%, and the area that was grown vegetable by 11.03%. These ratios show that there was a turning towards fruit agriculture from field agriculture.

Table 1. Agricultural land and its usage

	2001	2016	Index
Agricultural area	(hectare)	(hectare)	(2001=100)
Sowed	17 917 083	15 574 372	86.92
Fallow	4 913 634	4 049 998	82.42
Total field	22.830 717	19.624 370	85.96
Vegetable	909 305	808 986	88.97
Cultivated	23 740.022	20 433 356	86.07
Fruit	2 085 453	2 894 216	138.78
Vineyard	525 000	435 000	82.85
Total fruit and vineyard	2 610 453	3 329 216	127.53
Cultivat.+(fruit and vineyard)	26 350 475	23 762 572	90.18
Meadow and pasture	14 617 000	14 617 000	100.00
Total agricultural area	40 967 475	38 379 572	93.68
Total surface area		78 356 200	

Source: TUIK

In Table 2, total agricultural area of Turkey for period 2001-2016 was given (Anonymous, 2018c). When Table 2 examined, it is seen that total agricultural area decreased by 6.31%* in the last 15 years. According to the regression analysis, it is expected that decline of agricultural areas can continue in the following years. The consequences of this decline for Turkey will not be good:

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Agricultural production will have reduced, and Turkey will have been a dependent country on foreign countries in terms of agricultural products. Employment will have decreased, unemployment will have increased, and migration from rural to urban will have been accelerated. In short, the impacts of this decline on Turkey's economy will have been negative.

Table 2. Agricultural area of Turkey for period 2001-2016

n (year)	x		y (1000 hectare)	
2001	0	0	40 967	0
2002	1	1	41 196	41 196
2003	2	4	40 644	81 288
2004	3	9	41 210	123 630
2005	4	16	41 223	164 892
2006	5	25	40 493	202 465
2007	6	36	39 504	237 024
2008	7	49	39 122	273 854
2009	8	64	38 912	311 296
2010	9	81	39 011	351 099
2011	10	100	38 231	382 310
2012	11	121	38 399	422 389
2013	12	144	38 423	461 076
2014	13	169	38 558	501 254
2015	14	196	38 551	539 714
2016	15	225	38 380	575 700
Total	120	1.240	632 824	4 669 187

$$*(\%) = \frac{(\text{Last numeral} - \text{initial numeral})}{\text{Initial numeral}} \times 100 = (-) 6.31\%$$

In the research, total agricultural area of Turkey in the following years was estimated by regression model (by using the data in Table 2). In the analysis, it was accepted that other conditions remained stable in other words, there was no change in existing agricultural policies and agricultural conditions. (X) was independent variable (year) and (Y) also dependent variable (agricultural area). Decrease in the agricultural area from year to year showed that there was a nonlinear relationship between variables (Figure 1).

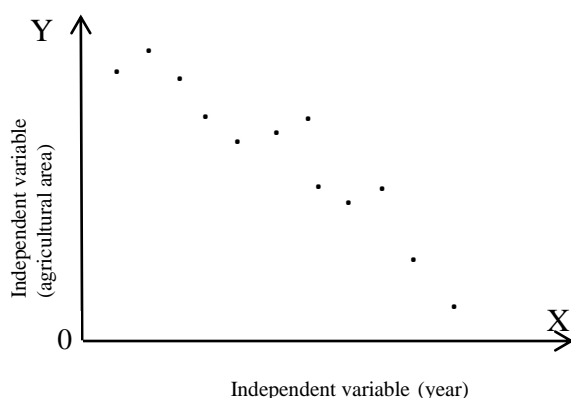


Figure 1. Relationship' case between variables

According to this, when taken into consideration ($Y = a + bX$) function, 15 years later, in other words, in 2031, it was guessed that the total agricultural area of Turkey will have been 34 467 thousand hectare.

For 2031 year;

$$Y = a + b X$$

$$Y = 41.247 + (-226 \cdot 30)$$

$$= 41.247 - 6.780$$

$$= 34\,467 \text{ thousand hectare.}$$

Developments in the Number of Rural Population and Agricultural Enterprises

Since the creator of economic life is human, the relationship between population and economy is quite high (Açıl ve Demirci, 1984). On the one hand while the population creates demand for goods and services, on the other hand it provides labor supply, which is one of the main production factors (Rehber and Çetin, 1998). In this context, the population is an important dynamic in terms of economic development.

In Table 3, rural and urban population ratios were given for period 2000-2016. In the study, since the data of 2001 year couldn't be accessed to, year of start was based on 2000 year. When table examined, in the 16-year period, rural population seems to have decreased significantly. Because, while rural population decreased by 74.19%, urban population increased by 67.41% (Anonymous, 2018d). Of course, on this decrease, it can be stated there was also effective that "the administrative fields of metropolitan municipalities with the law no. 6360 adopted in 2012 were considered as urban areas completely" (Anonymous, 2018e).

Rapid decrease of the rural population is closely associated with rural migrations. Low income in the rural and educational opportunities in cities speed the migrations towards urban from rural up (Yılmaz, 2015). Basically, rural migration is an economic decision (Cengiz and Baydur, 2010). Rural migrations lead to loss of qualified labor force in rural, and surplus of labor force and an unplanned urbanization in cities, too.

Table 3. Urban and rural population

Population	2000	2016	Index (2000=100)
	(person)	(person)	
Rural	23 797 653	6 143 123	25.81
Urban	44 006 274	73 671 748	167.41
Total	67 803 927	79 814 871	117.71

Source: TUIK

In Table 4, the number of agricultural enterprises was given in Turkey, In the study, since the data of 2001 year couldn't be accessed to, year of start was based on 2002 year. Thus, while the number of total agricultural enterprise of Turkey was 2 588 666 in 2002, in the last 14 years, it decreased by 12.42%, and it happened 2 267 176 (Table 4). In the same period, rural population decreased by 74.19% (Anonymous, 2018g). This was also a self-evident indication of transformation towards urban population of the rural population. In study, average enterprise size of Turkey was determined as 86 decare.

Table 4. The number of agricultural enterprises

2002	2016	Index (2002=100)
(number)	(number)	
2 588 666	2 267 176	87.58

Source: The Ministry of Agriculture and Forestry

Agriculture's Share in Total Employment

Employment is working of all production factors in an economy, and especially the labor force in working age (Çelik, 2015; Ünlüönen and Tayfun, 2005). In Turkey, the agricultural sector has an important share in total employment.

In Figure 2, agriculture's share in total employment was given. When Figure 2 was examined, it is seen that share of the agriculture in total employment decreased gradually. For instance, while share of the agriculture in total employment was 37.58% in 2001, it was 19.50% in 2016 (Anonymous, 2018h). Share of the agriculture in total employment decreased by 34.42% in the last 15 years.

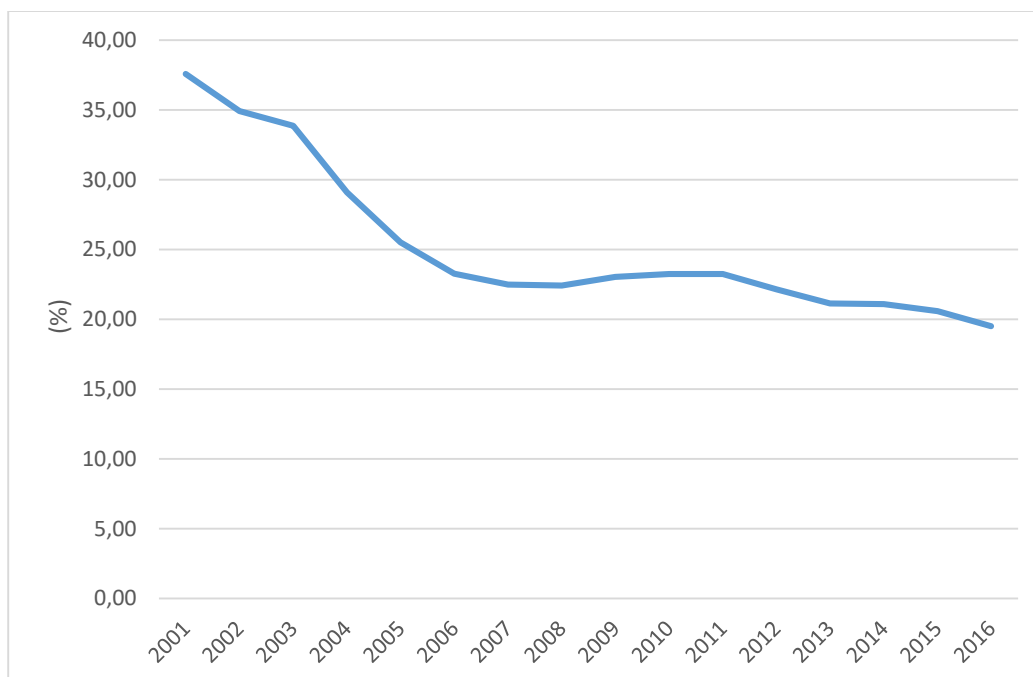


Figure 2. Agriculture's share in total employment

Agriculture's Share in Total Gross Domestic Product

Gross domestic product is sum value of final goods and services produced in a country in a year. Gross domestic product is fundamental criter to assess the performance of economy regarding goods and service production (Açıl, 1984; Ünlüönen and Tayfun, 2005).

Agriculture's share in total gross domestic product was given in Figure 3 with respect to years. When examined figure, it is seen even if income obtained from agricultural sector increased in the last 15 years, its share in total gross domestic product decreased. While income obtained from agricultural sector was 22 736 million USD in 2001, it was 53 276 million USD in 2016. But, while its share in total gross domestic product was 11.56% in 2001, it was 7.37% in 2016 (Anonymous, 2018i). In other words, in the last 15 years, the share that the agriculture received in total gross domestic product was balanced between 11.56% and 7.37%. Without forgetting Turkey is an agricultural country, it should be given consequence to the agricultural sector, and the share of agriculture in total gross domestic product should be increased.

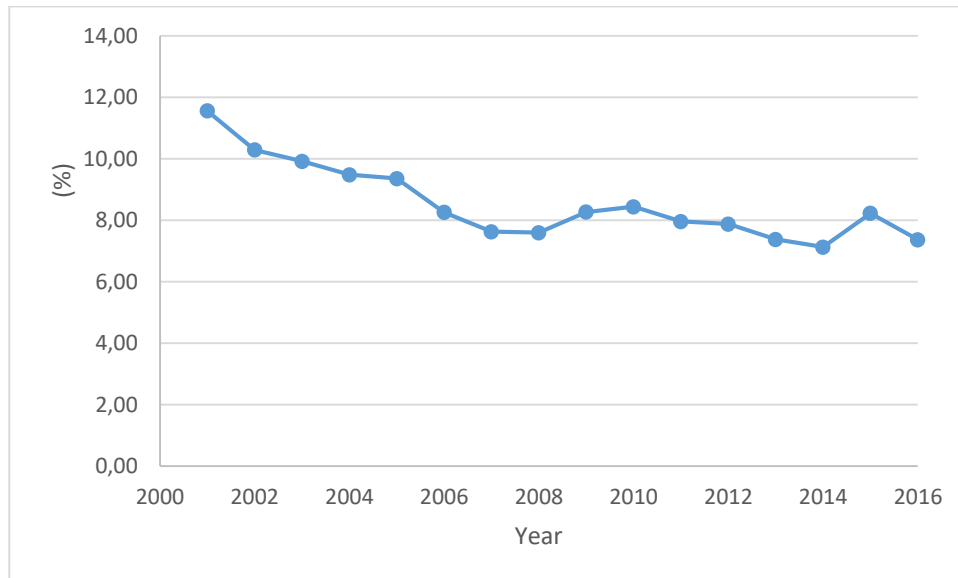


Figure 3. Agriculture's share in total gross domestic product

Agriculture's Share in Total Foreign Trade

Foreign trade is the goods, service and capital trade of a country with other countries (Arıkan, 1999). Foreign trade value consists of the sum of the export and import values of a country in a given period.

In Turkey, in the last 15 years, while agriculture's share in total export decreased, its share in total import increased (Figure 4). For instance, in 2001, share of the agricultural sector in total import was 5.95% and its share in total export was 13.09%. In 2016, they were 6.1% and 11.49%. While agricultural import was 2 464 million USD in 2001, it was 12 111 million USD in 2016 (Anonymous, 2018öj). In order to increase share of the agriculture in export, agricultural production should be increased, and new foreign markets created.

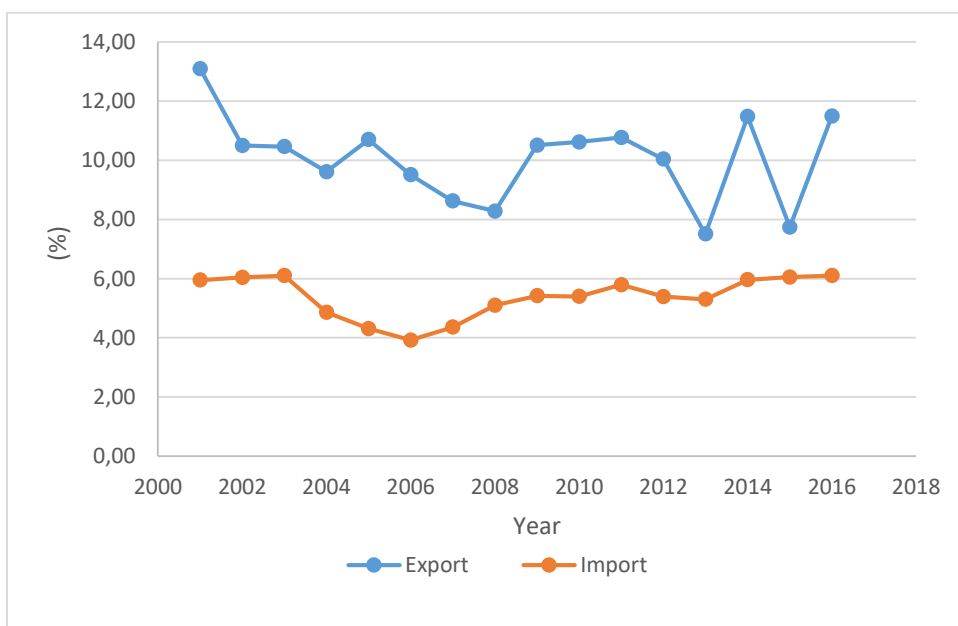


Figure 4. Agriculture's share in total foreign trade

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Developments in Vegetal Product' Production

In Table 5, production of some field crops and sowed land were given (Anonymous, 2018k). When the table was examined, in the last 15 years, it was seen that sowed field land and amount of production (especially legume plants) decreased. There was increase in forage plants' production. Naturally, this was a demonstration of turning towards animal husbandry from field farming. As long as there is no change in the agricultural policies, this turning towards is expected to continue in the future.

Table 5. Developments in production of some field crops

Field crops	2001		2016		Index (2001=100)	
	Sowed (decare)	Production (tons)	Sowed (decare)	Production (tons)	Sowed	Production
CEREAL						
Wheat	93 500 000	19 000 000	76 719 448	20 600 000	82.05	108.42
Barley	36 400 000	7 500.000	27 400 521	6 700 000	75.28	89.33
Rye	1 405 000	220 000	1 146 493	300 000	81.60	136.36
Oat	1 500 000	265 000	994 379	225 000	66.29	84.91
Millet	35 000	6 700	23 869	5 327	68.20	79.51
Meslin	82 000	11 650	4 100	615	5.00	5.28
Corn (grain)	5 500 000	2 200 000	6 800 192	6 400 000	123.64	290.91
Paddy	590 000	360 000	1 160 563	920 000	196.70	255.55
TOBACCO						
Raw tobacco	1.957.700	144.786	922.374	70.000	47.17	48.35
LEGUMES						
Chickpea	6 450 000	535 000	3 595 289	455 000	55.74	85.05
Beans (dry)	1 750 000	225 000	898 197	235 000	51.32	104.44
Lentil (green)	700 000	60 000	167 617	20 000	23.94	33.33
Lentil (red)	4 000 000	460 000	2 354 743	345 000	58.87	75.00
Kidney bean	29 000	2 000	18 079	1 860	62.34	93.00
Vetch (grain)	29 000	3 000	35 921	3 996	123.86	133.20
Broad bean	190 000	35000	27 512	6 280	14.48	17.94
Green pea	12 500	2 700	10 882	2 919	87.06	108.11
INDUSTRY PLANTS						
Sugar beet	3 587 630	12 632 522	3 224 477	19 465 542	89.88	154.09
Potato	2 000 000	5 000 000	1 448 572	4 750 000	72.43	95.00
OIL PLANTS						
Sunflower (oil)	5 100 000	650 000	6 167 800	1 500 000	120.94	230.77
Cotton seed	6 846 650	1 353 888	4 160 098	1 260 000	60.76	93.06
FORAGE PLANTS						
Clover(green)	2 490 000	1 830 000	6 501 107	15 714 381	261.09	858.71
Trefoil (green)	1 055 000	203 000	1 936 940	1 982 047	183.60	976.38
Vetch (grain)	2 400 000	127 000	526 762	66 987	21.95	414.53
Mangel	31 500	150 000	23 408	111 974	74.31	74.65
MEDICINEAND TEXTİLE						
Hash (capsule)	458 360	21 436	299 217	16 550	65.28	72.21
Cotton (massive)	6 846 650	2 357 892	4 160 098	2 100 000	60.76	89.06
Cotton (fiber)	6 846 650	914 404	4 160 098	756 000	60.76	82.68

Source: TUIK and FAO

Although Turkey is world's cereal central, it imports cereal from some countries. These countries which Turkey imported cereal in 2016 were Russia, USA, Netherlands, Germany, France, Bulgaria, Portugal, Spain, Mexico, Kazakhstan, and Ukraine (Table 6), (Anonymous, 2018l).

Developments in Animal and Animal Products' Production

Due to large pasture areas (14 617 thousand hectares), and mountainous and rugged structure (especially east and southeast regions), Turkey is a suitable country for animal husbandry. According to the data of 2016, Turkey's total animal presence was 41 329 232 (Table 7). But, because the number

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of animals wasn't at a sufficient level, Turkey had to import the farm animals (Anonymous, 2108m). For instance, in 2016, 494 301 bovine animal were imported, and it was paid 587 422 897 USD for import (Anonymous, 2018ö). This matter reveals that animal husbandry investments should be increased.

Table 6. Cereal import (2016)

Crops	(1000 tons)	(1000 \$)
Wheat	4 226	892 409
Barley	40	9 807
Corn	535	128 639
Paddy	202	73 731
Lentil	289	242
Cotton	793	1 192
Oil seed	2 654	1 270
Soybean	1 936	788
Sunflower oil (raw)	620	863
Pulp	1 386	384

Source: TUIK and The Ministry of Agriculture and Forestry

Table 7. The number of animals

Genus	2001	2016	Index (2001=100)
	(head)	(head)	
Cattle (native)	4 074 000	1 733 292	42.54
Cattle (culture)	1 854 000	6 588 527	355.37
Cattle (hybrid)	4 620 000	5 758 336	124.64
Mandate	138 000	142 073	102.95
Total bovine animal	10 686 000	14 222 228	133.09
Sheep (merino)	759 000	2 151 264	283.43
Sheep (native)	26 213 000	28 832 669	109.99
Goat (hairy)	6 676 000	10 137 534	151.85
Goat (mohair)	346 000	207 765	60.05
Total ovine	33 994 000	41 329 232	121.58

Source: TUIK

In Table 8, developments in animal products' production were given (Anonymous, 2018n). In 2001, while red meat production was 435 778 tons, in 2016, it was 1 173 042 tons. But, because red meat production wasn't enough to satisfy interior consumption, production deficiency was satisfied by imports. For example, in 2016, 4 066 tons of red meat was imported, and 29 464 983 USD was paid for import (Anonymous, 2018ö). These figures reveals that animal products' production was insufficient, and its production should be increased.

Table 8. Animal products' production

Livestock products	2001	2016	Index (2001=100)
	(tons)	(tons)	
Red meat	435 778	1 173 042	269
Milk	9 495 550	18 489 161	195
Chicken meat	614 745	1 879 018	306
Chicken egg (number)	10 575 046 000	18 097 605 000	171
Honey	60 190	105 727	176

Source: TUIK

For period 2001-2016, the agricultural area of Turkey decreased by 6.32%. The size of the surface area of Yalova is 850 km². In other words, in the last 15 years, the agriculture land as much as 30 times of the size of the surface area of Yalova province was pulled out of the agriculture. This shows that urgent measures should be taken to protect the agricultural lands.

Turkey is ranked 30th in the entire world with a total of 38 379 572 hectares of the agricultural land that it has. Total surface area of the Netherlands that is a country of European Union is 41 526 sq. km. Its surface area is a one-nineteenth of total agricultural land of Turkey. Its total agricultural land is 18.391 sq. km and one-twentieth that of Turkey's. However, value of its agricultural export was 55 billion USD and was 3.5 times more than Turkey's (Anonymous, 2018o). Its total agricultural foreign trade was also much more than that of Turkey. According to the data of 2014, while the Netherlands' total agricultural foreign trade was 176 billion USD that of Turkey was 34.3 billion USD (Erol, 2014). In the same year, while the Netherlands' agricultural export value was 90 billion USD, that of Turkey was 18 billion USD (Anonymous, 2018r). According to the data of 2012, wheat yield of the Netherlands was 858 kg decare⁻¹, and that of Turkey was 267 kg decare⁻¹ (Anonymous, 2012).

Advanced technologies used in agriculture made the Netherlands as second country exporting the most important agricultural product of Europe. When Turkey's and the Netherlands' agriculture were compared with each other, the importance of the science and the technology has shown up once again. When examined in this respect, there is a need for permanent and supportive arguments so that Turkey can use its agricultural power in real meaning. Therefore, without spending any time, science and technology in the agriculture must be transported to extreme points farmed.

In the same way, though rural population of the Netherlands have declined, its amount of the agricultural land has remained the same. Both rural population and amount of the agricultural land of Turkey decreased (Anonymous, 2018p).

CONCLUSION

Agricultural sector is one of necessary sectors for socio-economic development of Turkey. Since establishment of the Republic of Turkey, the agricultural sector has taken on important tasks both in economic and social life. Therefore, In Turkey, it isn't possible to neglect the agricultural sector. Therefore, it is useful to take into consideration the following points for agricultural sector.

Irregular rural migrations should be prevented and particularly young population should be brought in the agriculture. Therefore, rural areas should be encouraged in suitable methods and the agricultural sector should be worked up into an attractive and respectable sector.

In the period examined, it was seen there was a significant decrease in amount of the agricultural lands. "Law on Soil Protection and Agricultural Lands' Usage", which was put into force in 2005, should be in full implemented.

In the study, it was determined that total fallow area was too much. When based on 2016, 20.6% of total field land was fallowed. Thanks to suitable alternation system, both fallowed lands will be used and share of the agriculture in economy will increase.

Effective constructive policies about the agriculture should be developed. Among these policies, it is that all inputs including pesticides, veterinary medicines and its services and animal husbandry should be included in the scope of subsidy.

Agricultural price support policies should be product, production and farmer-focused for ensuring revenue stability.

Training and broadcast studies in rural should be conducted and farmers should be informed on advanced agricultural technology.

The share of the agricultural sector in total employment, gross domestic product and export should be increased. Therefore, high-class and new product varieties should be selected in accordance with demands of foreign market.

Encouragements and credits for the developing of animal husbandry should be made attractive, meadow and pasture lands should be used the best and sowing areas of forage plants should be expanded.

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