



The effects of Avian Influenza on the Turkey's Poultry Sector: Case of Eastern Anatolia Region

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Geliş Tarihi : 10.01.2009

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Kabul Tarihi :02.04.2009

Abstract

The study makes a projection about the current situation and the future of poultry obtained from the broiler sector in Eastern Anatolia Region, which is an important husbandry region of Turkey. 59.63% of the total chicken entity are broilers in 2006. The provinces of Malatya and Elazığ were determined to meet over 85.00% of total poultry production on their own. These two provinces were found to have 91.90% of the poultry of the region. Poultry amount per broiler in 1995 was 1.7 kg and this amount reached 3.3 kg in the year 2007. According to the annual average increase rate calculation, the number of broiler increased 59.58% annually and poultry production increased 22% during the period 2003-2006. According to the long term trend analysis which was made for the period 2007-2017, the number of broilers was estimated to fall behind the number in 2006. On the other hand, the projection made for the poultry production suggested that poultry production which was 20.382 tons in the year 2006 would reach 29.507 tons in the year 2020.

Key Words: Poultry, Broiler, Increase Rate, Trend Analysis, Avian Influenza, Turkey

INTRODUCTION

Avian influenza is a kind of infection virus infected by birds [1; 2]. However, this virus is defined as a new threat for the world economy. It was combined and related with such imponderable events as Asian economic crisis and global terrorism thus affecting the world economy in global scale [3]. Avian influenza and its derivatives affect not only the poultry sector, but also the sectors directly or indirectly related to this sector. It may have negative effects on agriculture, food, medicine, feeds, tourism, transportation, marketing and other husbandry facilities. The disease cost 2.7 billion to agriculture and food sectors and 3.2 billion in tourism in the United Kingdom [4; 5].

In the first three months of the year 2006, avian influenza virus was reported in wild birds and domestic cats in Asia, Africa and the Middle East as well as 23 countries in Europe [6; 2]. Avian influenza affected the poultry sector negatively. The loss of France, which is has the largest poultry industry in Europe was 40 million (\$48 million) whereas Germany lost 140 million. The sales of Hungarian poultry producers decreased in the rate of 20% [7; 2]. In a study analyzing the potential economic effects of avian influenza in Nigeria, the most optimistic scenario suggested that the national poultry production would lose 4% because of the virus. On the other hand, the most pessimistic scenario put forward that the country would be relentless to consume poultry meat and in consequence poultry production would fall behind in the rate of 21%. That meant that the loss of the poultry industry in this sector would be \$250 million [9]. Pathogenic avian influenza (HPAI) was largely taken under control in Western Europe and South East Asia (except Indonesia), yet it still poses a threat and is spreading in Africa [9; 10; 8]. Since the beginning of the year 2006, the virus has occurred in Burkina Faso, Cameroon, Ghana, Niger and Nigeria [11; 12; 8] 223.000 chicken out of 325.000 only in Nigeria died of

the disease and the rest were slaughtered. The spread of HPAI caused heavy losses in poultry sector of Western Africa [13; 14; 15; 8]. According to the estimations of The World Bank, the cost of this virus to the global economy was \$800 billion per annum [16; 2].

Turkey is one of the countries suffering avian influenza in minimum scale. No professional or commercial institution in Turkey encountered avian influenza. Turkey applies two projects of \$56 million and 14.5 million in order to combat avian influenza [17]. Poultry sector in Turkey has been developed between 1990-2006 gradually. However, years 1994 and 2001 were decrease due to economic crisis in Turkey. So, the 2 years were ignored. However, there was a recession period in 2005-2006. This recession may be expressed because of the effects of avian influenza on poultry consumers. That is why sales of bulk poultry decreased in the rate of 25% in this period after the occurrence of avian influenza. This grave problem was gotten over without experiencing serious losses in production [18]. Producers should be well organized and have a good marketing web in case of the potential or existing problems in other sectors as well as in poultry sector.

Food products are subjected to a series of processes from agricultural operation to the retail sales channels [19] and reach the end user. Each step of marketing channels is important in terms of competitiveness, high-quality product and employment. There are institutions in almost all countries which deal with organization of sectors. For example, BESD-BİR-Poultry Meat Producers and Breeders Association in Turkey and "Chicken Farmers of Canada (CFC)" in Canada are the pioneering organizations in this context [20]. Apart from these, European Food Safety Authority (EFSA) is another example, which is responsible for food safety and early notification in case of food threats in Europe [21]. In Turkey, Ministry of Agriculture and Rural Affairs conducts food safety supervisions.

Poultry sector maintained its development process in Turkey since 1970s and was subjected to an important structural change after 1980s. As a result of this change, the sector became an important production branch which could make production planning and meet the countries needs. Approximately 80% of the poultry are produced in modern facilities in Turkey and these facilities are nearly 20 years younger than their similar ones in Europe [22; 23; 24]. However, Turkey is a dependant country in terms of brooders. The daily chicks (eggs for hatching) belonging to parent stock bought from abroad by brooder hatching facilities are brought up and mated and then they are sold to the producer firms via branches [23].

The contribution of poultry sector to economy and thus to employment cannot be ignored. Approximately 12.600 broilers and 2.800 egg fowls are available in the sector. Approximately 2 million people (average four-person family) get on by this sector which employees nearly 500.000 people (as producer farmers, artisans including feeds, medicine, subsidiaries, transportation and marketing). The turnover of the sector is about \$3 million. Daily poultry production (double shift) capacity of Turkey is about 4.000 tons whereas the yearly capacity is 1.250.000 tons. Capacity use rates of slaughterhouses and growing fowls are 80% [18]. Of domestic poultry sales, 75% is whole chicken, 25% is parts 73% of which is leg and brisket, 11% of which is gizzard, 6% of which is neck, 6% of which is wing and 4% of which is fillet [24].

Technological level or production quality in poultry sector in Turkey can be regarded equal to the European standards. A technical team coming from the European Union examined 6 slaughterhouses in the year 2006 and they found them compliant with the standards according to their report. The report mentioned above stated obviously that Turkey, too, could be included among the third countries eligible for poultry production. Turkey was included among the third countries on 24th January, 2006 by Food Chain and Animal Health Standing Committee of SANCO of EU Commission. The resolution was published in the official gazette of the EU and then put into force. However, because of chicken plagues occurring in October 2005 and later, the resolution was suspended without reaching [18].

In the year 2007, Ministry of Agriculture and Rural Affairs applied to the EU about the exportation of thermal processed poultry meats into the borders of the European Union. Therefore, advanced processing departments of 8 slaughterhouses, precautions taken against Avian Influenza and New Castle occurring in Turkey and the laboratory registries were examined by taking into account the functions of laboratories in terms active supervision of poultry slaughterhouses, food controls and disease diagnoses. The conditions of the examined slaughterhouses were found compliant with the EU norms in general terms. [18].

The purpose of this study is to determine the current situation and the future of Poultry Sector in Eastern Anatolian Region (Figure 1), where is known as the husbandry stock of Turkey before and after Avian Influenza as well as to give information about poultry sector in Turkey.

MATERIAL AND METHOD

The main materials of the study are comprised of the statistical data about broilers and the poultry obtained from these broilers on the web site of Turkish Statistical Institute. In addition,

related articles, essays, reports and the media were used as materials.

The scope of the study is Eastern Anatolia Region of Turkey. There total 13 provinces in the region. These are Ağrı, Ardahan, Bingöl, Bitlis, Erzurum, Erzincan, Elazığ, Hakkâri, Iğdır, Kars, Malatya, Van and Tunceli (Figure 1). General economic structure of the region is premised on agriculture and husbandry.

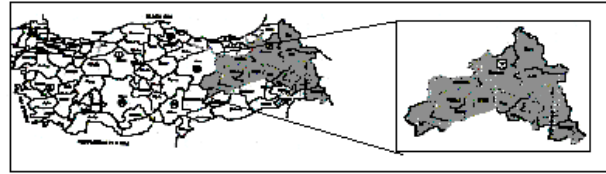


Figure 1. View of Eastern Anatolian Region on Turkey Map

The crude statistical data obtained within the scope of the study were processes and transformed into tables and at last they were interpreted. The simple index of the factors such as broilers and poultry meat:

$$\dot{I} = (P_i / P_0) * 100$$

$$\dot{I} = () * 100$$

\dot{I} : Simple index for current year

P_i : The amount of current i

P_0 : Based on the a amount of 0

Chain Index;

$$\dot{I} = (P_i / P_{i-1}) * 100$$

$$\dot{I} = () * 100$$

\dot{I} : Chained index for current year

P_i : The amount of current i

P_{i-1} : Current year the amount of the previous year

and annual average increase rates [25];

$$= (((\text{Last Year}/\text{First Year})^{(1/n)}) - 1) * 100$$

made the subject more understandable with the help of these formulas..

Non-linear trends were tried in the long-term analysis, but Least Square Method, which was appropriate to the data, was used. This method helped calculate average value and increase rate. [26]. The trend line in his method is expressed mathematically as;

$$Y = a + bx$$

b coefficient gives us the long-term trend (annual average value);

$$b = \frac{\sum xy - n\bar{X}\bar{Y}}{\sum x^2 - n\bar{X}^2}$$

$$a = \bar{y} - b\bar{x}$$

X: Coding according to year in the lead of the series, Y= the factors to be long-term analyzed, n= number of years coded, \bar{X} : the average of the sum of the years coded, \bar{Y} : the average of the sum of the factor within the scope of the long-term analysis according to the years. Accordingly, the graphic of the rice production deficit was drawn after making its long-term analysis and its trend equation was calculated and then some estimation was made with the help of the average increase and fall values in rice production.

RESULTS AND DISCUSSION

Poultry Meat Production in Turkey

Turkey in 1994, ranks 14th in the world in terms of poultry meat production. The most effective solution for meeting the deficit of animal protein is poultry meat production in Turkey. Poultry meat production is considerably important so that Turkish population can have a balanced diet. While poultry sector has a production amount of 217.000 tons in the year 1990, this amount reached 752.000 in the year 2000 and 1.032.000 tons in 2006. Of 2006 poultry production, 946.000 tons is chick meat, 46.000 tons is turkey meat, and 40.000 tons is hatching meat and other meats [18].

The animal protein deficit occurring as a result of the reduction in red meat consumption could be balanced with the help of the increase in poultry production. Poultry production per capita in 1990 was 3.8 kg and it reached 14 kg in the year 2005 and it saves its position. Average consumption rate in the EU countries is over 26 kg per capita [18].

Foreign Trade Conditions in Turkey in terms of Poultry Sector

Poultry exportation adversely affected by the occurrence of Avian Influenza in October 2005 reached 45.000 tons by rising 55% when compared to the year 2004 in spite of all the problems in the sector. In the year 2005, 27.278 tons of chick meat, 1.929 tons of turkey meat and 15.767 tons of chicken leg were exported. In 2006, because of the restrictions stemming from avian influenza, the exportation numbers for 7 months were 17.500 tons for chick meat and 20.000 tons for chicken legs, which makes 38.000 in total [18]. Poultry exportation of Turkey is concentrated on the Far East, the Middle East, Caucasia, and Balkans. Turkey gains a share of 0.12% from the world's poultry meat exportation [24].

General Problems of Poultry Sector in Turkey

✓ *High Costs of Raw Materials;* 70% of the costs are feeds and 55% of the feeds are corns. A ton of corn costs \$285 US in the domestic market whereas it costs \$160 US in foreign markets. A heavy customs duty is imposed if the corn is imported (130%). Almost all of the soy beans and soybean meals are supplied by importation. Soybean importation is subjected to 10% customs duty and soybean meal importation is subjected to 13% customs duty [18].

✓ *Insufficiency of Exportation Support;* The fact that the net amount obtained from exportation return of chick meat is \$26 US per ton is one of the biggest hindrances before the exportation. The USA gives a support of \$600 per ton for chick meat exportation and the EU gives a support of \$430 per ton for the same exportation. Therefore, it can be concluded that Turkey cannot compete with the poultry sectors of the USA and the EU and improve its exportation strategies under these conditions [18].

✓ *Avian Influenza;* Avian influenza was densely effective in rural poultry sectors.

✓ *High Amounts of Value Added Tax (VAT),*

Table 1. Broiler and Poultry Meat on the basis of Provinces

	Broiler		Cut the Broiler		Poultry Meat	
	Number	%	Number	%	Amount (ton)	%
Ağrı	0	0.00	0	0.00	0	0.00
Ardahan	15.450	0.22	0	0.00	0	0.00
Bingöl	0.00	0	0	0.00	0	0.00
Bitlis	11.100	0.16	0	0.00	0	0.00
Elazığ	5.335.003	77.49	5.327.403	44.45	8.577	42.08
Erzincan	827.200	12.02	1.436.677	11.99	2.356	11.56
Erzurum	85.460	1.24	297.594	2.48	637	3.13
Hakkâri	1.175	0.02	0	0.00	0	0.00
Iğdır	0	0	0	0.00	0	0.00
Kars	6.500	0.09	0	0.00	0	0.00
Malatya	5.750.650	8.36	4.922.694	41.08	8.812	43.23
Muş	27.000	0.39	0	0.00	0	0.00
Tunceli	0	0	0	0.00	0	0.00
Van	0	0	0	0.00	0	0.00
Total	12.059.538	100.00	11.984.368	100.00	20.382	100.00

Poultry Sector in Eastern Anatolia Region of Turkey

The share of the region in Turkey in terms of broiler was 2.41% and in terms of poultry production was 2.24%.

Broiler takes more space in Eastern Anatolian Region of Turkey among other types of chickens. The share of broilers in total chicken entity was 65.99% in 2005 while this percentage decreased continuously until 1998 and was replaced by egg hens. Broiler (poultry) sector redeveloped in the 2000-2002 periods; however it continued falling behind after this period. The share of broilers in total chicken entity was 59.63% in the year 2006. Whereas there were 24.2 million broilers in the region, the total chicken entity was calculated 40.6 million.

Poultry amount which was nearly 12.4 tons in the region in the year 1995 reached 18.800 tons in 2001. However, the sector experiencing a recession in 2003 redeveloped in the year 2004 and reached 32.500 tons in 2005. Poultry meat production fell

Table 2. Annual Average Increase Rate in Broiler Production

Periods	Broiler	Poultry Meat
1995-98	-30.46	14.10
1999-2002	-5.56	-2.26
2003-2006	59.58	22.00

to 20.400 tons in 2006 when compared to the year 2005. Poultry meat amount per broiler was 1.7 kg in 1995 and this amount reached 3.3 kg in 2007. In later periods, poultry meat amount per broiler varied between 2.1 and 2.7 kg. In the year 2006, poultry meat amount per broiler witnessed its lowest level (0,8 kg) [27].

No poultry meat production was observed in the provinces of Ağrı, Bingöl, Iğdır, Tunceli and Van in Eastern Anatolia Region. Malatya and Elazığ were reported to meet more than 85% of the needs of the region in terms of poultry meat. 91.9% of the total chicken entity of Eastern Anatolia Region is in these two provinces (Table 1). Elazığ meets 3.6% of broiler production needs and 0.7% of egg hen production needs. Therefore, it is in charge of meeting 3.1% of the costs stemming from the

Table 3 Simple Index in Poultry Meat Production (1995-97=100)

Periods	Broiler (number)	Poultry Meat (ton)
1995-97	100.00	100.00
1998	29.08	141.29
1999	158.98	131.00
2000	141.85	124.88
2001	144.53	126.35
2002	126.45	119.55
2003	64.47	61.87
2004	104.92	97.77
2005	209.84	218.45
2006	418.12	137.06

marketing of these products. Elazığ province is an important producer in this sector because there is an important private operation within the borders of this province (KÖYTÜR AŞ) [28]. The existence of Seher Tavukçuluk and Öznesil Tavukçuluk, which are two different poultry firms, makes Malatya province another important producer of the poultry sector in Turkey.

Annual Average Increase Rates and Simple and Chain Index Analyses of Factors

Although there was an annual average decrease of -30.46% in broiler number in the period 1995-98, the annual average in-

Table 4 Chain Index in Poultry Meat Production

Period	Broiler (number)	Poultry Meat (ton)
1995	-	-
1996	58.28	99.94
1997	142.49	160.00
1998	28.16	105.98
1999	546.79	92.72
2000	89.22	95.32
2001	101.89	101.18
2002	87.50	94.62
2003	50.98	51.75
2004	162.75	158.02
2005	200.00	223.44
2006	199.26	62.74

crease of poultry amount was 14.10%. This can be explained by the fact that there may be some infertile chickens in the sector or that the fertility per broiler is high. While there were negative increase rates between 1999 and 2002, the annual average increase in broiler numbers was 59.58% and the increase of poultry meat was 22.00% in the period between 2003 and 2006. The increase rate of broilers was over the increase rate of poultry meat amount. That is to say that 1%-unit of increase in the number of broilers may not necessarily be reflected in the amount of poultry meat (Table 2).

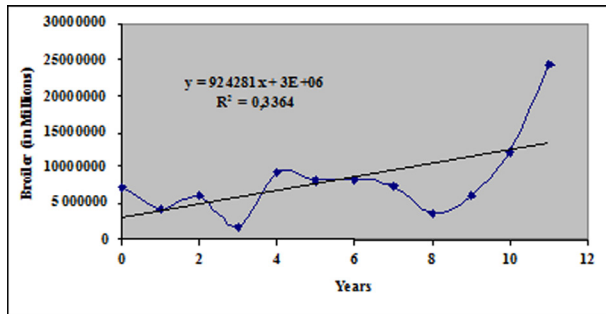
While there was a decrease of -70.92% in the number of broilers in the year 1998 according to the period on which the data were based, there seemed an increase of 41.29% in the amount of poultry meat in the same year. Broiler sector regained its strength after 1999; however it came across a very grave crisis because of the occurrence of avian influenza disease in the year 2003. During this period, poultry sector diminished -35.53% on the basis of number of broilers and -38.13% on the basis of poultry meat amount. However, according to the period (2005) on which the data were based, number of broilers and amount poultry meat were doubled whereas these increase rates were four times more in the number of broilers and 37.06% in the poultry meat amounts (Table 3).

When the chain index of the number of broilers during the period 1995-2006 is examined, a fluctuation is observed. While the number of broilers increased when compared to the previous years, there occurred decreases in the following years. The

Table 5 Long-Term Analyses of Broilers

Current Situation		Estimated Period	
Years	Broiler (in Millions)	Years	Broiler (in millions)
1995		2007	13.1
1996	7.2	2008	14.0
1997	4.2	2009	14.9
1998	6.0	2010	15.9
1999	1.7	2011	16.8
2000	9.2	2012	17.7
2001	8.2	2013	18.7
2002	8.4	2014	19.6
2003	7.3	2015	20.5
2004	3.7	2016	21.4
2005	6.1	2017	22.3
2006	12.2	2018	23.3
	24.2	2019	24.2
		2020	25.1

Figure 1. The Long-Term Trend Analysis of Broilers During the Period 1995-2006



period which can be regarded stable in terms of broilers was 2004-2006 period. The increase of 62.75% in the number of broilers in 2004 when compared to the previous year appeared as the double in the year 2005 when compared to the previous year. However, in the year 2006, there was 1.9 times increase in the broiler sector whereas there was a decrease of -37.26% in the poultry meat sector (Table 4).

Table 6. Long-Term Analysis of Poultry Meat Production

Current Situation		Estimated Period	
Years	Poultry Meat (Thousand-Ton)	Years	Poultry Meat (Thousand-Ton)
1995	12.4	2007	21.3
1996	12.4	2008	22.0
1997	19.8	2009	22.5
1998	21.0	2010	23.0
1999	19.5	2011	23.6
2000	18.6	2012	24.2
2001	18.8	2013	24.8
2002	17.8	2014	25.4
2003	9.2	2015	26.0
2004	14.5	2016	26.6
2005	32.5	2017	27.2
2006	20.4	2018	27.7
		2019	28.3
		2020	28.9

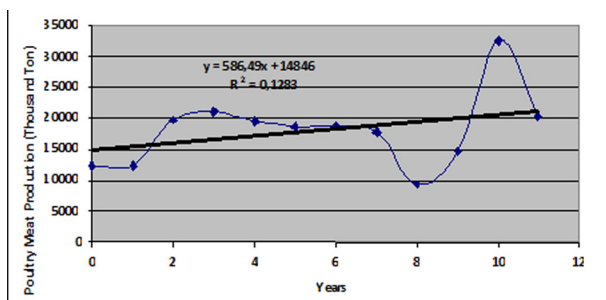


Figure 2. Long-Term Trend Analysis of Poultry Meat Production During the Period 1995-2006

Long-Term Trend Analysis of Poultry Meat Production in Eastern Anatolia Region of Turkey

According to the long-term trend projection, the number of broilers in the period 2007-2018 will fall behind the number of broilers in the year 2006. The estimated number of broilers for the year 2019 will reach 24.2 million and it will reach 25.1 million for the year 2020. These conditions suggest that the broiler sector be developed and supported in the region (Table 5).

When the long-term analysis of the poultry meat production was examined, poultry meat production which was 20.382 tons in the year 2006 was estimated to reach 23.000 tons in 2010, 26.000 tons in 2015 and 28.900 tons in the year 2020. This situation suggests that poultry meat sector became more stable when compared to the broiler sector (Table 6).

CONCLUSION

✓ 80% of poultry meat produced in Turkey is produced in modern operations and these operations are 20 years younger than their similar ones in developed countries.

✓ Therefore, Turkish poultry sector is estimated to be under better conditions when modern operations, product diversity, suitable production methods are taken into consideration.

✓ There were negative effects of Avian Influenza on the poultry sector during the period 2005–2006. However, the sector got over this problem without experiencing grave conditions stemming from this disease.

✓ No traces of Avian Influenza were observed in professional and modern production operations. However, the disease affected the rural broiler sector adversely.

✓ Feed problem is one of the main problems of the sector and it has negative impacts on costs and indirectly on the appropriate prices which are necessary for exportations.

✓ The high levels of VAT (Value Added Tax) imposed on the poultry sector is one of the most important points affecting the costs.

✓ Broiler sector fell behind egg hen sector in eastern parts of Turkey instead of helping develop other sectors and providing sources for employment.

✓ The broiler sector in the region and its share in Turkey's economy was dissatisfying in terms of number and production of broilers.

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