

RESEARCH ARTICLE

EFFECTS OF KAHRAMANMARAŞ EARTHQUAKES IN SOUTH OF TURKEY ON LİVESTOCK ACTIVITIES

Yüksel Akin

PhD. Usak University, Graduate Education Institu Dep. of Animal Science, Uşak, Turkey.

Manuscript Info

Abstract

Manuscript History Received: 28 January 2023 Final Accepted: 28 February 2023 Published: March 2023

*Key words:-*Livestock, South of Turkey, Earthquake, Kahramanmaras, Hatay

..... Animal husbandry is one of the most important economic activities that humanity has been carrying out since its existence in order to meet the need for animal protein which has an important place in nutrition. In Turkey, on February 6, 2023, two destructive earthquakes with a magnitude of Mw=7.7 and Mw=7.6 occurred in the Pazarcık and Elbistan districts of Kahramanmaras in the south of Turkey. The earthquake caused the death of tens of thousands of our citizens in Adıvaman. Diyarbakır, Elazığ, Gaziantep. Adana. Hatav. Kahramanmaras, Kilis, Malatya, Osmaniye, Sanliurfa and seriously damaged our livestock. After the disaster, it was observed that many producers were unable to care for their animals due to the risk of epidemics that may arise from the animals that perished and the general damages that may arise from the loss of animals, especially the supply of feed, which is the most important problem for the animals that are rescued and currently kept. Delays in reaching rural areas during the earthquake revealed that a special structure should be established for villages in similar disasters. Structures such as intervention units for rural areas affiliated with AFAD can help with this.

Copy Right, IJAR, 2023,. All rights reserved.

Introduction:-

Animal husbandry is one of the most important economic activities that humanity has been carrying out since its existence in order to meet the need for animal protein which has an important place in nutrition. Meat is one of the primary food sources in the balanced diet of people in terms of the proteins it contains and its satiety. Protein amounts in animal foods are 15-20% in meat, 19-24% in fish, 12% in eggs, 3-4% in milk, and 15-25% in cheese (Anonymous, 2020). For a healthy diet, animal products such as red and white meat, milk, and eggs should be consumed regularly. In the TİGEM Livestock Sector 2021 report, it is stated that according to the 2020 data from the World Food Organization (FAO), 43 kg of meat is supplied per capita in the world every year (Anonymous, 2021). The food consumption culture in Turkey is largely based on the consumption of herbal products. For this reason, animal protein consumption is lower than in many countries (Akdur, 2017). According to FAO 2018 data, daily protein consumption per capita in Turkey is 110.7 grams, of which 72.8 grams consists of vegetables and 37.9 grams of animal protein (FAO, 2018). Considering that the world population exceeds eight billion today, the development and sustainability of animal husbandry for adequate, balanced, and healthy nutrition have been one of the primary policies of all world countries.

.....

Corresponding Author:- Yüksel Akin

Address:- PhD. Usak University, Graduate Education Institute Dep. of Animal Science, Uşak, Turkey.

In recent years, the livestock sector has been increasing its importance in terms of providing the necessary raw materials in livestock-based industries. In light of this information, it should not be forgotten that animal husbandry is a sector of strategic importance for its protection and sustainability at the national level. Livestock sector; in addition to being composed of components such as the feed industry, meat, and products industry, dairy and products industry, leather and textile industries, veterinary drugs, and livestock equipment industries, it creates added value to economies by creating new employment areas and processing animal products (Anonymous, 2020). The breed, age, and yield level of the animal material used in livestock enterprises are the factors that determine the success of the enterprises. Turan et al., (2017) stated that animal material and management quality are important economic success criteria in determining the production value of the activity units and agricultural income of the enterprise. Ergün and Bayram (2021) explained that the development of the agricultural sector in a country is related to the economic development of that country. Although it is seen that developed countries come to the fore with their industries, it is seen that agriculture is supported more in these countries than in developing countries. Yavuz (2000) associated the developed countries' greater emphasis on supporting the agricultural sector with their advanced economic power.

The livestock sector in Turkey has an important place and potential in the general economy (Ergün and Bayram, 2021). In addition to having suitable climatic conditions for carrying out all kinds of livestock activities, Turkey has an extremely important geopolitical position in terms of marketing the products obtained from these activities. Its current geopolitical location offers many advantages, as well as earthquakes, floods, landslides, fires, etc. natural disasters are the disadvantages that attract attention to the sector. It also acts as a bridge in the spread of epidemic diseases such as bird flu, alum, and bovine tuberculosis. For this reason, especially possible epidemics, natural disasters, wars, etc. In such cases, all countries of the world must have alternative plans and policies for the continuity of agricultural products (Akin et al., 2020). Sentürk (2015) stated that the liberalization of world trade makes it impossible for developed countries to continue their past successes in epidemic control. As a matter of fact, the fact that countries turn to border protection measures and buffer zone applications shows that they cannot prevent the spread of diseases on a global scale. Two devastating earthquakes with a magnitude of Mw=7.7 and Mw=7.6 occurred in the Pazarcık and Elbistan districts of Kahramanmaras on February 6, 2023, in Turkey. The earthquake struck Adana, Adıyaman, Diyarbakır, Elazığ, Gaziantep, Hatay, Kahramanmaras, Kilis, Malatya, Osmaniye, Sanliurfa and neighboring provinces and was felt over a wide area covering Syria, Lebanon, Cyprus, Iraq, Israel, Jordan, Iran and Egypt. Between these two major destructive earthquakes, more than 11 thousand aftershocks, the largest of which are Mw=6.7 and Mw>6.0, have occurred and it is stated that many aftershocks continue to shake the earthquake region (AFAD, 2023). As a result of the earthquakes, according to official figures, it was announced that at least 47.932 people in Turkey and 8.476 people in Syria lost their lives, and more than 129 thousand people were injured in total (Anonymous, 2023a). Major earthquakes in the history of Turkey are shown in Figure 1, and the fault line where the earthquake occurred and the affected area is shown in Figure 2.



MAJOR EARTHQUAKES IN TÜRKİYE'S RECENT HISTORY

Figure 1:- Major earthquakes in the history of Turkey (Anonymous, 2023b).



Figure 2:- The fault line where the earthquake occurred and the affected area (Anonymous, 2023c).

The provinces where the earthquake was experienced and affected have an important place among the livestock activities of Turkey. The damage and consequences of the earthquake to the rural areas where animal husbandry is made have not been fully determined. In the provinces affected by the earthquake, livestock and other agricultural activities are generally carried out by the middle-aged-old population. In the region where the loss of life was quite high, forced migration was also encountered and this situation brought to mind how animal husbandry activities can be continued. The lack of sufficient products from the region may cause uncontrolled increases in food prices, which may cause a food crisis in the future. In order to eliminate the problems experienced, the Ministry of Agriculture and Forestry and its affiliates, universities, and private and legal institutions should take an active role, and the problems should be identified and resolved quickly. In this study, livestock activities in Turkey, the place and importance of the provinces affected by the earthquake in livestock activities, the problems experienced after the earthquake, the measures taken, and solution suggestions were tried to be presented.

Livestock Activities In Turkey

There have been significant changes in animal husbandry activities and animal existence in Turkey since the establishment of the Republic. The highest numerical values in terms of animal presence were reached between the years 1960-1980. In Turkey, until the 1970s, domestic breeds were used in both bovine and ovine breeding activities and pasture animal husbandry was adopted. During these periods, the animals were grazed on natural pastures in spring and summer and were fed with dry grass, straw, and limited concentrate during the winter months (Anonymous, 2021). Since the 1980s, in parallel with the development of industry, tourism, and service sector, city life has been adopted, and there has been a rapid migration from villages to cities. With the decrease in the rural population, there has been a rapid decrease in livestock activities and animal presence. Table 1 shows the population of Turkey regarding the sectors (TUIK, 2020; Akin et al., 2020).

Table 1:- Distribution of Active Population by Sectors in Turkey (%) (TUIK, 2020; Akin et al., 2020).

Vears	SECTORS					
1 cars	Agriculture	Industry		Service		
1075	67.30	12 10		20.60		

1080	60.00	15 50	24.50
1985	59.00	1/1 90	26.10
1000	53 70	17 50	28.80
1005	46.80	15.20	38.80
2000	35.20	24.30	40.50
2005	25.50	21.60	52.90
2010	23 30	21.10	55 70
2015	10.50	19 50	61.00
2020	17.00	10.00	63 10

Since 2000, there have been continuous increases in large-scale modern livestock facilities owing to state support and incentives. (Anonymous, 2021). The number of animals in Turkey for the last 5 years and their change over the years are shown in Table 2.

	2018	2019	2020	2021	2022
Cattle	17.043.000	17.688.000	17.963.000	17.851.000	17.693.000
Buffalo	178.000	184.000	192.000	186.000	183.000
Sheep	35.195.000	37.276.000	42.127.000	45.178.000	46.123.000
Goat	10.922.000	11.205.000	11.986.000	12.342.000	12.325.000
Broiler	229.506.689	221.841.860	258.046.340	270.393.122	251.289.799
Laying hen	124.054.810	120.725.299	121.302.869	121.000.775	109.806.327
Goose	1.080.190	1.157.049	1.373.960	1.477.569	1.385.507
Turkey	4.043.332	4.541.102	4.797.793	4.703.797	3.669.726
Duck and other poultry	532.841	519.575	559.620	539.897	432.457

Table 2:- Number of animals in Turkey for the last 5 years and their change over the years.

More than 99% of the bovine stock in Turkey is cattle and approximately 1% is buffalo. This can be explained by the high milk yield of the cattle, the long lactation period, and the high ability to convert roughage and concentrate into meat and milk. In cattle breeding in Turkey, Holstein, Simmental, Brown, and Jersey, which have high dairy characteristics, are preferred (Anonymous, 2021). While the specified breeds are mostly preferred in enterprises where livestock and modern livestock activities are practiced, local breeds are common in small familial enterprises. An important part of the indigenous breeds in Turkey is the Native Black, Gray, Eastern Anatolian Red, and Southeastern Yellow-Red breeds. In the 1990s, 10% of Turkey's 12 million cattle assets were cultural breeds, 34% were hybrid breeds, and 56% were domestic breeds. In 2021, 49% of the total 17.5 million cattle assets were cultural breeds with the acceleration of animal husbandry supports and improvement studies and the preference for cultural breeds by farmers. Parallel to this situation, while milk production from cattle was 8.6 million tons in 1990, it increased to 21.4 million tons in 2021. Approximately 75% of the country's red meat needs and 92% of milk production are met by cattle (Anonymous, 2021). Turkey's beef exports and imports in recent years are shown in Table 3.

5	1 1	,		, ,	
	2015	2018	2019	2020	2021
Export (ton)	40	109	169	501	386
Import (ton)	17.574	55.752	5.046	4.580	1.205
Export (USD)*	458.000	1.061.000	1.545.000	2.422.000	1.491.000
Import (USD)*	104.916.000	260.108.000	26.634.000	26.717.000	7.210.000

Table 3:- Turkey's beef export and import amounts for the years 2015-2021 (Anonymous, 2021).

^{*}Approximate values are written by rounding up the values in USD.

It is seen that Turkey is quite suitable for sheep and goat breeding in terms of pasture areas, natural vegetation, geographical features, and cultural and socio-economic structure. Ovine breeding has an important place in benefiting from areas where plant production cannot be done in Turkey as well as in the whole world. Sheep and goats are very suitable animals for the evaluation of unproductive pastures, fallow lands, stubble, and products not suitable for plant production. With these aspects, they enable the production of products such as meat, milk, fleece, hair, leather, and fertilizer in a short time. While there was a significant decrease in the number of sheep and goats in Turkey between 2007 and 2008 due to the drought, the establishment of Breeding Sheep and Goat Breeders' Associations in the provincial centers throughout the country, the Ministry of Agriculture and Forestry's implementation of the "national project of animal breeding in the hands of the people", and the introduction of sheep

breeding began in 2007 (Anonymous, 2021). The increase in government incentives provided sheep breeding to gain importance again and after 2010, there was an 82% increase in the number of sheep. The increase in government incentives enabled sheep breeding to gain importance again and after 2010, there was an 82% increase in the number of sheep. Sheep breeding has been an important source of livelihood in Eastern Anatolia and Southeastern Anatolia regions. There are Akkaraman, Morkaraman, Dağlıç, Kıvırcık, Chios, Merino, Karayaka, Karagül, Avesi, Hemşin, Tuj, Malya, Türktahirova, Herik, Acıpayam, Bafra, Sönmez and Polatlı sheep breeds in Turkey. Many of these breeds constitute our important gene resources obtained as a result of breeding and selection studies. Goat farming, which provided a livelihood for many segments in the past, lost its importance between 1991 and 2010, and the number of goats decreased from 10.7 million in 1991 to 6.3 million in 2010. Since 2010, as a result of the increase in demand for goat milk and its products in recent years, the presence of goats has gradually reached the figures of 1991 in 2020, even surpassing it (Anonymous, 2021).

Poultry breeding has become one of the most important fields of activity of livestock activities in Turkey, after sheep and cattle breeding. In recent years, there has been a continuous increase in consumption due to the increase in the urban population, the relatively low unit price, and the healthy white meat. Consumers, who are becoming more sensitive about healthy nutrition every day, have turned to less oily and cheaper poultry meat as an alternative to red meat (Saygin and Demirbas, 2018). Poultry breeding is mostly done in the Marmara Region of the country, followed by the Aegean and Central Anatolian regions. Egg and meat poultry farming, which is carried out by the private sector, is ahead of many countries in terms of technique and technology used in addition to its economic size. Although various animal species such as chicken, turkey, goose, and duck are included in the poultry group, chickens are mainly grown for meat and eggs in Turkey, as in all countries of the world (Anonymous, 2018). According to TUIK data64%, broiler 35%, laying hen 1,3%, turkey 0.3%, goose and 0.1% duck constitute the presence of poultry in Turkey, in 2019 (TUIK, 2019). Integrated companies in the sector have breeding houses, hatcheries, feed factories and slaughterhouses, and a strong marketing organization. Many of the facilities owned by integrated companies are facilities where newer and more advanced technology is used compared to other countries (Koca, 2019). While Turkey's poultry meat production was 0.66 million tons in 2000, it increased 3.3 times to 2.19 million tons in 2019. This production is constituted of 2.13 million tons of hen meat and 0.6 million tons of turkey meat constitute. When compared proportionally, 97.3% of poultry meat production is chicken and 2.7% is turkey meat (Anonymous, 2019). Eggs are nutritious, delicious, and the cheapest protein source, as well as the easiest to digest food. Chicken egg production in Turkey, which was 11.8 billion units in 2010, increased to 16.7 billion units in 2015 and 19.8 billion units in 2020 (Anonymous, 2020).

Place of Earthquake-Affected Provinces In Livestock Activities

The animal species and numbers produced in the last 5 years in the provinces affected by the earthquake are shown in Table 4.

Adana	Bovine	Ovine	Broiler	Laying Hen	Other Poultry		
					Turkey	Goose	Duck and
							others
2018	265.430	807.900	6.315.554	920.694	2.592	8.921	2.220
2019	259.684	833.027	6.006.135	550.485	2.519	17.629	2.072
2020	248.307	875.041	5.675.279	968.219	2.040	9.138	2.045
2021	266.601	1.116.289	6.223.395	980.728	2.041	8.863	2.419
2022^{*}	-	-	6.863.825	817.445	2.430	3.869	30.283
Adıyaman							
2018	129.194	343.577	60.000	202.660	4.240	6.995	1.909
2019	147.606	369.938	59.500	189.185	4.365	2.007	1.373
2020	146.860	412.242	0	263.170	3.391	4.099	1.378
2021	111.470	368.544	0	181.475	4.165	3.056	1.416
2022^{*}	-	-	80.000	100.240	3.803	3.300	1.555
Diyarbakır							
2018	589.462	1.834.639	187.308	482.852	67.389	15.566	15.143
2019	663.843	1.923.606	273.377	823.463	72.071	21.732	19.605
2020	656.074	2.091.344	73.261	879.031	207.631	121.354	25.279

Table 4:- Animal species and numbers produced in the earthquake zone in the last 5 years (TUIK, 2023).

2021	608.214	2.209.368	162.128	683.363	462.601	65.342	23.209
2022*	-	-	170.166	677.578	257.724	64.919	22.764
Elazığ							
2018	187.418	698.745	3.859.944	1.299.940	18.178	11.081	2.860
2019	191.431	722.178	3.772.688	1.332.810	17.248	10.747	2.943
2020	209.142	854.456	2.853.085	1.549.065	31.352	9.445	1.333
2021	187.326	1.089.120	5.164.918	1.639.785	31.677	7.215	1.256
2022*	-	-	5.748.638	1.626.920	28.825	7.377	1.216
Gaziantep							
2018	271.879	625.949	248.600	4.105.483	27.275	2.700	3.322
2019	227.568	652.832	278.258	4.688.338	25.743	2.694	3.533
2020	191.669	648.092	287.679	5.242.086	24.214	4.270	3.560
2021	200.050	698.317	295.000	5.803.485	26.478	3.041	3.372
2022*	-	-	400.600	6.117.889	11.578	2540	2.315
Hatay							
2018	154.382	396.960	55.001	425.410	2.002	5.385	4.978
2019	146.732	414.512	277.900	415.130	1.753	5.057	4.682
2020	148.036	473.022	425.455	423.057	1.773	6.603	5.024
2021	149.206	538.745	594.750	479.585	1.674	6.255	5.064
2022*			652.000	362.514	1.570	5.692	4.383
Kahramanmaras							
2018	215.223	837.589	239.000	1.236.106	10.608	8.197	9.049
2019	220.163	925.327	395.000	1.343.801	10.154	8.475	7.451
2020	204.803	1.019.351	853.000	1.246.467	16.113	9.283	8.137
2021	242.239	1.170.072	866.950	1.342.589	15.894	9.307	8.490
2022*	-	-	328.984	1.004.416	17.841	10.222	7.846
Table 4: Animal sp	ecies and nu	mbers produc	ed in the earth	nquake zone in t	he last 5 years	s – (Continu	es)
Kilis							
2018	12.999	210.009	170.000	79.700	2.795	950	750
2019	13.000	219.616	145.000	49.050	2.060	330	325
2020	12.950	226.001	239.000	67.675	1.174	150	142
2021	12.785	222.698	219.000	76.450	1.929	556	261
2022*	-	-	214.000	88.100	2.110	560	290
Malatya							
2018	174.321	338.433	2.257.400	834.812	2.249	916	823
2019	180.649	358.018	2.724.172	1.025.840	2.259	971	715
2020	176.729	359.599	3.452.681	793.049	3.092	1.552	1.005
2021	174.986	367.606	5.250.515	827.574	3.760	2.602	1.335
2022*	-	-	5.828.188	875.310	3.720	2.071	1.255
Osmaniye							
2018	85.896	224.616	519.000	155.299	959	1.109	2.901
2019	80.669	229.174	554.000	166.813	935	1.256	3.056
2020	76.055	235.781	1.273.000	149.477	779	2.171	1.231
2021	68.292	249.684	1.307.248	154.983	812	2.075	1.119
2022*	-	-	790.578	317.605	1.333	2.804	1.713
Şanlıurfa							
2018	352.084	2.148.664	42.250	522.630	80.598	25.116	9.983
2019	324.457	2.215.725	40.000	530.912	82.027	22.967	8.082
2020	344.211	2.581.865	40.000	508.550	42.796	7.742	4.570
2021	331.181	2.428.459	40.000	654.136	44.476	8.345	4.827
2022*	-	-	40.000	607.941	38.332	8.115	4.712

*The numbers of bovine and ovine animals for the year 2022 have not been yet announced by TUIK.

When the animal husbandry activities of the provinces affected by the earthquake in Table 4 for the years 2021-2022 are examined; Diyarbakir is the leading provinces with 608,000, Sanhurfa 330,000, and Adana 260,000 cattle. These three provinces constituted 6,75% of the total amount of cattle in Turkey, while other provinces constituted 6,40%. In ovine breeding, 2.4 million units were produced in Sanliurfa, 2.2 million units in Divarbakir, 1.1 million units in Adana and Kahramanmaras, and this production amount corresponds to 12.00% of the total amount of ovine. The ratio of other provinces in the region in total production was realized as %5,90. In the production of broilers, the remarkable provinces are Adana with 6.8 million, Malatya 5.8 million, and Elazig 5.7 million constituted the 7.28% of broiler production, and the other provinces constituted 1.05% of the total broiler production in 2022. In laying hens, Gaziantep met 6.1 million, Elazig 1.6 million, Kahramanmaraş 1 million, which constituted 7,92% of the total laying amount. The rate of other provinces in the region is 3,47%. Divarbakir is the city that draws attention with its production exceeding 257 thousand tons in turkey production. This is followed by Sanliurfa and Elazığ, respectively, and these three provinces met 8,80% of the total turkey production, while the other provinces met 1,08%. Goose production in Turkey is very low in terms of poultry. Despite this, Diyarbakir is in first place with nearly 65 thousand geese, while Sanliurfa and Kahramanmaras are important provinces following Diyarbakır with around 10 thousand geese. While 6,13% of the total goose production is met by these provinces, the rate of other provinces is 1,78%. Adana and Diyarbakir are our leading provinces in duck and other poultry production, with 53 thousand units, 12,26% of the total production, while other provinces constituted 5,11% of the total production. According to Table 4, Diyarbakir, Sanliurfa, Gaziantep and Adana have a significant share in all livestock activities both within the earthquake zone provinces and within the animal stock in Turkey. Therefore, the rapid elimination of the effects of the earthquake in this region is very important for the sustainable livestock activities of the country.

Problems In The Sector After The Earthquake, Measures Taken, And Suggestions For Solutions

The areas affected by the earthquake have an important share in the livestock sector. Especially Diyarbakir and Sanliurfa have an important place in sheep breeding. It was announced by the Turkish Chamber of Agricultural Engineers that many agricultural engineers, veterinarians, and technical personnel lost their lives in the Region (Anonymous, 2023d; Anonymous, 2023f). This situation revealed the necessity of sending emergency technical personnel to the region. This situation should not be ignored, especially in order to provide support to the farmers who are in a difficult situation due to the earthquake. Due to the destruction in the villages in the earthquake, tractors and similar tools used in agriculture were seriously damaged and many animals perished. Following the disaster, it has been explained that many producers are unable to care for their animals due to the risk of epidemics and the general damages that may arise from the animals that perished, especially the supply of feed, which is the most important problem for animals that are rescued and currently held (Anonymous, 2023e). The Ministry of Agriculture and Forestry has stated that the Presidential Decision on providing feed support per animal for once between February 2023 and 31 December 2023 in the region where the earthquake took place was published in the Official Gazette dated 17 February 2023 and entered into force (Anonymous, 2023g). In the related decision, "Feed support will be provided to the breeders registered in the TÜRKVET database within the Livestock Information System, not exceeding the number of animals registered in the system and the upper limit to be determined by the Ministry of Agriculture and Forestry the statement is included. However, considering the fact that the point of access to the villages and the damage assessment has not been fully determined, it may not be enough for the Ministry of Agriculture and Forestry to determine which producer will receive support for how many heads of cattle and pay for the current situation, and it requires serious time. In addition, it was stated by the Ministry that diesel and fertilizer support in cash to farmers in the provinces affected by the earthquake would start in February.

As a result of trying to solve the sector's problems with imports after the earthquake, it seems difficult to reintroduce the breeders who will give up animal husbandry (Karakuş, 2011). The high prices of raw materials, which are the most important inputs of the sector, increase the costs, and this situation stands out as the main problem hindering the development of the sector. The problems experienced due to the unsustainability of agricultural organizations and cooperatives in Turkey in general increase the input costs of the producers and narrow the market opportunities of the animal products produced. This reduces the competitiveness of especially small-scale enterprises. If the necessary measures are not taken quickly in the provinces where livestock factors are greatly affected after the earthquake, irreparable problems may arise. Although there has been a significant increase in the number of cattle, sheep and poultry, and animal product production in the last 20 years, our consumption of animal products, which is the main indicator of a healthy and balanced diet, is lower than in developed countries. In order to increase our protein consumption of animal origin, long-term permanent studies should be carried out in order to make the sector attractive where the producerscan profit and animal products add value, to take measures to prevent information

pollution in animal food consumption, and to popularize meat-milk-egg consumption habits. Reducing the production costs and providing a structuring (cooperative, union, branded-packaged end product, direct marketing) in Turkey, especially for the producers in the earthquake zone, will increase the consumption of animal food.

In order to avoid similar situations in natural disasters, such as earthquake a series of formations should be implemented. Delays in reaching rural areas after the earthquake revealed that a special structure should be established for villages in similar disasters. Structures such as intervention unit for rural areas affiliated to AFAD can help with this. The existence of an institutional structure such as the General Directorate of Rural Services, which operated in Turkey in previous years but was closed in 2005, can also provide effective intervention in similar situations. The population engaged in animal husbandry activities in the region is generally composed of middle-aged-old producers. The sustainability of animal husbandry stands before us as a major problem due to the death of these producers in the earthquake or if the existing farmers withdraw from the production. However, the region is one of the areas with the youngest population potential in Turkey. A solution to the problem can be found with incentives and credit policies for young people. The possibility of people who lost their relatives not being in the psychology to carry out their work for a while is a different problem. Apart from these, there is a permanent or temporary migration wave from the rural areas of the provinces affected by the earthquake to different provinces. This situation can seriously reduce the labor force in the livestock sector. If measures are not taken in this regard, it may cause irreparable problems in animal production.

Discussion:-

More than 10 earthquakes of Mw=7.0 and above have occurred in Turkey for nearly 100 years since its establishment, with a devastating effect on a large scale. After these earthquakes, scientific studies in Turkey generally focused on fault lines, socioeconomic effects, etc. In the literature review, a limited number of scientific studies on the effects of earthquakes on the livestock sector have been reached. The earthquake with a magnitude of Mw = 9.0 in Tohoku, Japan on March 11, 2011, caused serious damage to the agricultural sector. After the earthquake in Japan, significant damages occurred in the agriculture, hunting, and forestry sectors. It is stated that approximately 4.550,000 poultry, 5,850 pigs, and 750 beef cattle perished in the provinces of Aomori, Iwate, and Miyagi. In total, 28,612 fishing vessels, 1,725 communal facilities, and 319 ports were reported to be damaged (Bachey and Ito, 2017). The Mw=7.6 earthquake that struck Nepal's Kathmandu city on April 25, 2015, and the subsequent aftershocks, had serious impacts on the country's agriculture and agricultural biodiversity. Approximately 135,200 tons of foodstuffs, 16,399 cattle, 36,819 sheep and goats, and 60,762 poultry were destroyed. The agricultural sector suffered total damage. The maximum loss in mountainous regions was 86%, with a loss of 255 million USD. (Gauchan et al., 2017; NPC, 2015; Rasul et al. 2015). Animal feed, livestock, poultry, fish farms, animal feed stocks, egg and honey production, and stored foodstuffs were the most affected agricultural products in the country after the earthquake (Gauchan et al., 2017).

After the earthquake in Turkey, no official statement has been made regarding animal husbandry yet. It is seen that only the policies regarding feed and premium payments per animal are given priority. After the disaster in Japan, it has been pointed out that there were problems in sector such as agriculture, fisheries, food processing, etc., where many difficulties continue especially for small and medium-sized companies (Bachey and Ito, 2017). Similarly, after the earthquakein Turkey, associations and organizations etc., of which producers, and farmers engaged in animal production are members tried to voice their problems in the press (Anonymous, 2023d; Anonymous, 2023e). It has been stated that even in Japan, which has a very good economy, only 45% of companies have reached pre-earthquake levels only six years after disasters. It has been reported that the total production value of agriculture, forestry, and fishery products in Fukushima significantlydecreased (Bachey and Ito, 2017). For this reason, Turkey, which is one of the economically developing countries, is likely to experience the negative effects of the earthquake on the sector for a long time. Total crop and livestock damage of the 2011 earthquake in disaster areas in Japan was estimated at 14.2 billion yen. One year after the disasters about 78% of the surveyed meat farmers, and about half of the mushroom and dairy producers, reported that they were severely damaged by the disasters (Bachey and Ito, 2017). In Turkey, the problems of the farmers should be solved as soon as possible in order to carry out damage assessment studies and to ensure the sustainability of animal production.

Conclusion:-

After the earthquake in Japan, experts emphasized the importance of constantly examining the effects and factors of disasters in society, disaster management, and post-disaster reconstruction, transmitting the obtained information to

the public and transferring it to the next generations (Bachey and Ito, 2017). As a result, although it is not possible to stop natural disasters, it is necessary for each country to learn from past disasters by seeing their shortcomings and transferring their experiences to future generations. In the globalizing world, this issue is of vital importance for all countries to protect their natural resources and for sustainable livestock.

Acknowledgments:-

I would like to thank my esteemed professor "**Prof.Dr.Murat Hişmanoğlu**" and the academicians of Uşak University School of Foreign Languages for their efforts in the editing of this article in English.

References:-

- 1. AFAD, 2023. Press Bulletin-36 about the Earthquake in Kahramanmaraş. https://en.afad.gov.tr/press-bulletin-36-about-the-earthquake-in-kahramanmaras. Son Erişim Tarihi: 27 Şubat 2023.
- 2. Akdur, R. (2017). Piliç etinin halk sağlığı açısından önemi. 4. Uluslararası Beyaz Et Kongresi, 26-30 Nisan 2017, 188-192, Antalya.
- 3. Akin, Y., Çelen, B., Çelen, M. F., & Karagöz, A. (2020). Tarım ve pandemi: Covid-19 sonrası Türk tarımı nasıl değişmeli. EJONS International Journal on Mathematic, Engineering and Natural Sciences, 16, 904-914.
- 4. Anonim, 2018. Kanatlı hayvancılık sektör politika belgesi 2018-2022. T.C. Tarım ve Orman Bakanlığı Tarımsal Araştırmalar Genel Müdürlüğü, Ankara, https://www.tarimorman.gov.tr/Konular/Plan-Program-Ve-Faaliyet-Raporlari/sekt%c3%b6r-politika-belgeleri, Erişim tarihi: 01.08.2021.
- Anonim, 2020. 2020 yılı hayvancılık sektör raporu. T.C. Tarım ve Orman Bakanlığı Tarım İşletmeleri Genel Müdürlüğü, Ankara. https://www.tigem.gov.tr/DosyaGaleriData/View/a374cc25-acc1-44e8-a546-63b4c8bce146, Son Erişim tarihi: 11.03.2023.
- Anonim, 2021. 2021 yılı hayvancılık sektör raporu. T.C. Tarım ve Orman Bakanlığı Tarım İşletmeleri Genel Müdürlüğü, Ankara. https://www.tigem.gov.tr/DosyaGaleriData/View/a374cc25-acc1-44e8-a546-63b4c8bce146. Son Erişim tarihi: 11.03.2023.
- 7. Anonim, 2023a. Kahramanmaraş depremleri. https://tr.wikipedia.org/wiki/2023_Kahramanmara%C5%9F_depremleri#cite_note-16. Son Erişim Tarihi: 11 Mart 2023.
- Anonim, 2023b. Timeline: Major earthquakes that hit Türkiye in recent decades.https://www.trtworld.com/magazine/timeline-major-earthquakes-that-hit-t%C3%BCrkiye-in-recentdecades-65262. Son Erişim Tarihi: 07 Mart 2023.
- Anonim, 2023c. Geography class: Turkey and Syria's devastating earthquakes in graphicshttps://www.ft.com/content/d5445e43-e884-40f1-9141-3df6c1e13737. Son Erişim Tarihi: 07 Mart 2023.
- 10. Anonim,2023d.TürkiyeZiraatMühendisleriOdası.https://www.zmo.org.tr/genel/bizden_detay.php?kod=37782&tipi=3&sube=0.Son Erişim Tarihi: 27 ŞubatŞubat2023.
- 11. Anonim, 2023e. Tarım Dünyası. https://www.tarimdunyasi.net/2023/02/15/krizdeki-hayvanciliga-bir-darbe-dedeprem-vurdu/. Son Erişim Tarihi: 12 Mart 2023.
- 12. Anonim, 2023f. Depremde Tarım ve Orman Bakanlığı ailesinden 123 çalışanımızı kaybettik. https://www.tarimorman.gov.tr/Haber/5754/Depremde-Tarim-Ve-Orman-Bakanligi-Ailesinden-123-Calisanimizi-KaybettikSon Erişim Tarihi: 01 Mart 2023.
- 13. Anonim, 2023g. Resmi Gazete, 2023. 17 Ocak 2023 tarih ve 32107 sayılı Resmi Gazete.https://www.resmigazete.gov.tr/eskiler/2023/02/20230217.pdf. Son Erişim Tarihi: 01 Mart 2023.
- 14. Bachev, H., & Ito, F. (2017). Agricultural Impacts of the Great East Japan Earthquake–Six Years Later. Available at SSRN 2977972.
- 15. Ergün, O. F., Bayram, B. 2021. Türkiye'de Hayvancılık Sektöründe Yaşanan Değişimler. Bahri Dağdaş Hayvancılık Araştırma Dergisi, 10(2), 158-175.
- 16. FAO, 2018. Food and Agricultute Organization of The United Nations, http://www.fao.org/faostat/en/#data/FS, Son Erişim Tarihi: 12 Mart 2023.
- 17. Gauchan, D., Joshi, B. K., & Ghimire, K. H. (2017). Impact of 2015 earthquake on economy, agriculture and agrobiodiversity in Nepal. Rebuilding Local Seed System of Native Crops in Earthquake Affected Areas in Nepal. Proceedings of National Sharingshop.
- 18. Karakuş, K. (2011). Türkiye'nin canlı hayvan ve kırmızı et ithaline genel bir bakış. Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 1(1), 75-79.

- 19. Koca, S. (2019). 5. Uluslararası Beyaz Et Kongresi açılış konuşması. 5. Uluslararası Beyaz Et Kongresi, 24-28 Nisan 2019, 18-28, Antalya.
 - 20. NPC, 2015. Nepal earthquake 2015: Post Disaster Needs Assessment Vol. A. Key Findings. NPC, Kathmandu, Nepal.
 - 21. Rasul G, B Sharma, B Mishra, N Neupane, T Dorji, M Khadka, S Joshi. 2015. Strategic framework for resilient livelihoods in earthquake-affected areas of Nepal. ICIMOD Working Paper 2015/6, Kathmandu.
- 22. Saygın, Ö., Demirbaş, N. (2018). Türkiye'de kırmızı et tüketimi: sorunlar ve öneriler. Selçuk Tarım ve Gıda Bilimleri Dergisi, 32(3), 567-574.
- 23. Şentürk, B. 2015. Türkiye'de salgın hayvan hastalık sorunu ve yeni model önerileri. Harran Üniversitesi Veteriner Fakültesi Dergisi, 4(1), 27-29.
- 24. Yavuz, F. 2000. Türkiye'de tarım politikası. Atatürk Üniversitesi Ziraat Fakültesi Dergisi, 31(Özel Sayı), 20.
- Turan, Z., Şanver, D., Öztürk, K. 2017. Türkiye'de hayvancılık sektöründen süt inekçiliğinin önemi ve yurtiçi hasılaya katkısı ve de dış ülkelerle karşılaştırılması. Ömer Halisdemir Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 10(3), 60-74. Son Erişim Tarihi: 18 Şubat 2020.
- 26. TÜİK, 2020. Nüfusun Sektörlere Dağılışı. https://data.tuik.gov.tr/Kategori/GetKategori?p=istihdam-issizlik-veucret-108&dil=1. Son Erişim Tarihi: 01 Mart 2023.
- 27. TÜİK, 2023. Türkiye'de Hayvan Sayıları İstatistikleri. https://data.tuik.gov.tr/Kategori/GetKategori?p=tarim-111&dil=1. Son Erişim Tarihi: 01 Mart 2023.