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The Situation of Livestock Activities in the Earthquake Region After the Kahramanmaraş Earthquakes

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Abstract: In Turkey, two devastating earthquakes with magnitudes $M_w=7.7$ and $M_w=7.6$ in Kahramanmaraş on February 6, 2023, had significant negative effects on the livestock fattenings of the region. It was announced that 8,241 bovines, 64,260 ovines and 42,000 poultry died in the region, and 533,000 chicks died in Adıyaman and 168,000 chicks in Malatya. It was determined that the total loss was at the level of 602.5 million TL (31.9 million dollars). To breeders; 1 billion 372 million TL feed support, 5.804 bovines, 43.317 ovines, 549.000 poultry and 26.318 beehives were provided. While there were no significant changes in the number of bovines in the earthquake region, the reduce in the number of ovines in the leading provinces in terms of the presence of ovines compared to the pre-earthquake period is as follows; It was determined as 102,000 in Şanlıurfa, 107,000 in Adana, 74,000 in Elazığ, 61,000 in Kahramanmaraş and 15,000 in Diyarbakır. In broiler breeding, there was a decrease of 13.57% in Hatay, 11.68% in Kilis, and 9.40% in Malatya. In laying hen breeding respectively there was a decrease of 21.21% in Diyarbakır, 15.65% in Hatay, 15.49% in Kilis, and %8,64 in Osmaniye. The Ministry of Agriculture and Forestry (MAF) tried to prevent losses in livestock and withdrawal from breeding with cash and in-kind aid. In the future, it is vital for the sustainable livestock activities of the region that investments, loans and incentive packages in the earthquake zone are among the priority policies of the Ministry.

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1. Introduction

The livestock sector consists of components such as the meat and products industry, feed industry, veterinary medicines, leather, and textile industries. It creates added value to the country's economy by creating new employment areas and processing animal products (Anonymous, 2020). Ergün and Bayram (2021) pointed out that the development of the agricultural sector in a country is related to the economic development of that country. Akin (2023) reported that although industrial sectors are at the forefront in developed countries, the agricultural sector is supported more than in

developing countries. Giving more importance to agricultural sector financing in developed countries is related to the economic power of those countries (Yavuz, 2000). The livestock sector has a significant place and potential within the agricultural sector and the general economy in Turkey (Ergün and Bayram, 2021). Turkey has suitable climatic conditions where all kinds of livestock fattenings can be carried out, and it also has an extremely substantial geopolitical location in terms of marketing the products supplied from these activities. Although this special location offers many advantages, the country can face natural disasters such as earthquakes, floods, landslides, and fires at times. In addition, the livestock sector may suffer serious damage due to the spread of epidemic diseases such as bird flu, bovine tuberculosis, and foot and mouth disease (Akin, 2023). Akin et al., (2020) stated that all countries in the world should have alternative plans and policies regarding the continuity of agricultural products in cases such as possible epidemics, natural disasters, and wars. There have been significant changes in livestock and animal husbandry in Turkey from the founding years of the Republic to the present day. The maximum numerical values in terms of animal existence were reached between 1960 and 1980. Since the 1980s, there has been a fast migration from villages to cities as city life has been adopted in parallel with the development of tourism, industry, and service sectors. With the reduction in rural population, there has been a rapid reduction in livestock fattenings and animal existence. Table 1 demonstrate Turkey's population by sector (Anonymous, 2024a; Akin, 2023; TÜİK, 2020).

Table 1: Distribution of Active Population in Turkey by Sectors (%) (Anonymous, 2024a; Akin, 2023; TÜİK, 2020)

Years	Sectors		
	Agriculture	Industry	Service
1975	67,30	12,10	20,60
1985	59,00	14,90	26,10
1995	46,80	15,20	38,80
2000	35,20	24,30	40,50
2010	23,30	21,10	55,70
2020	17,70	20,50	61,80
2021	17,20	21,30	61,50
2022	15,80	21,70	62,50
2023	14,80	21,20	64,00

Since 2000, thanks to government support and incentives, there has been a continuous increase in large-scale modern animal husbandry facilities. (Anonymous, 2021). The number of animals in Turkey for the last five years and their changes over the years are demonstrated in Table 2. According to the table; Comparing the two-year period before the earthquake (2022) and after the earthquake (2023), there was a general reduce in all livestock fattenings, except for broiler breeding. While the total cattle assets were 16.8 million in 2022, it reduced by 2.56% to 16.4 million, and the number of buffalos decreased by 5.87%, from 171 thousand to 161 thousand. The number of sheep decreased by 5.88% from 44.6 million to 42 million, and the number of goats reduced by 11% from 11.5 million to 10.3 million. Among the poultry animals, the number of laying hens decreased by 9.25% from 121 million to 109.8 million, and the number of other poultry such as turkeys, geese, ducks and Guinea fowl reduced by 6.56% in total from 5.4 million to 5.1 million. Although there was no significant change in broiler breeding, it raised by 1.14% from 251.2 million to 254.1 million units. More than 99% of the bovines population in Turkey is cattle and about 1% is buffalo. This situation can be announced by the high milk yield of cattle, their long lactation period to ensure milk production throughout the year, and their high ability to convert roughage and concentrated feed into meat and milk. Turkey's geographical features, natural vegetation, pasture areas, and cultural and socio-economic structure appear to be quite suitable for sheep and goat breeding. In Turkey, as in the rest of the world, ovine breeding has an considerable place in benefiting from areas where crop production is not possible. Goats and sheep are appropriate animals for utilizing inefficient fallow lands, stubble, pastures, and products that are

not appropriate for plant production. With these aspects, they facilitate the production of products such as meat, milk, wool, leather, feathers, and fertilizer in a short period. Sheep breeding has created a substantial source of income in the Southeastern Anatolia and Eastern Anatolia regions. Goat breeding, which provided a livelihood for many people in the past years, lost its importance between 1991 and 2010, and the number of goats reduced from 10.7 million heads in 1991 to 6.3 million heads in 2010. Since 2010, as a result of the increased demand for goat milk and products in the present years, the presence of goats has gradually reached or even exceeded the figures of 1991 in 2020 (Anonymous, 2021).

Table 2: Number of animals in Turkey for the last five years and their alteration by year (TUIK, 2024)

	2019	2020	2021	2022	2023	Nca*	Rca %**
Cattle	17.688.139	17.965.482	17.850.543	16.851.956	16.421.256	-430.700	-2,56
Buffalo	184.192	192.489	185.574	171.835	161.749	-10.086	-5,87
Sheep	37.276.050	42.126.781	45.177.690	44.687.888	42.060.470	-2.627.418	-5,88
Goat	11.205.429	11.985.845	12.341.514	11.577.862	10.302.940	-1.274.922	-11,01
Broiler	221.841.860	258.046.340	270.393.122	251.289.799	254.147.577	2.857.778	1,14
Laying Hen	124.054.810	120.725.299	121.302.869	121.000.775	109.806.327	-11.194.448	-9,25
Goose	1.157.049	1.373.960	1.477.569	1.385.507	1.328.175	-57.332	-4,14
Turkey	4.541.102	4.797.793	4.703.797	3.669.726	3.378.790	-290.936	-7,93
Duck and others	519.575	559.620	539.897	432.457	420.515	-11.942	-2,76

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Poultry breeding has become one of the most substantial areas of animal husbandry in Turkey, after bovine and ovine breeding. In recent years, with the increase in urban population, there has been a continuous rise in the consumption of white meat due to its comparatively low unit price and the healthiness of white meat. Consumers, who are becoming more susceptible to healthy nutrition day by day, have gone towards poultry meat, which is less fatty and cheaper, as an alternative to red meat (Saygin and Demirbaş, 2018). Although multifarious species of animals such as hens, geese, turkeys, and ducks are involved in the poultry group, hens are mainly raised for meat and eggs in Turkey, as in all countries of the world (Anonymous, 2018). Poultry breeding is mostly maintained in the Marmara Region of Turkey, followed by the Aegean and Central Anatolia regions. Laying hen and broiler breeding, carried out by the private sector, is ahead of many countries in terms of the techniques and technology used, as well as its economic size. In Turkey, two devastating earthquakes of magnitude Mw=7.7 and Mw=7.6 in Kahramanmaraş on February 6, 2023, had significant negative effects on the livestock fattening of the region. The provinces where the earthquake occurred and was affected have a substantial place in Turkey's livestock fattening. Since animal husbandry and other agricultural fattenings are generally carried out by the middle-aged and elderly population in the provinces affected by the earthquake, the region, where the loss of life was high, was also faced with forced migration, and this hurt livestock fattenings.

As a result of studies aimed at determining the damage to the total livestock in the livestock sector, it was determined that 8,241 bovines, 64,260 ovines, and 42,000 poultry animals died, and 533,000 chicks in Adıyaman and 168,000 chicks in Malatya perished. It was stated that breeders suffered a loss of 602.5 million TL (31.9 million dollars) due to animal deaths. It was announced that 13,284 of the 233,230 sheepfolds and barns in the earthquake area were destroyed (Anonymous, 2024b; Anonymous, 2024c). The Ministry of Agriculture and Forestry (MAF) announced that the Presidential Decision regarding a one-time feed support per animal between February 2023 and 31 December 2023 in the region where the earthquake occurred, entered into force by being published in the Official Gazette dated 17 February 2023 (Anonymous, 2023a). The relevant decision states that "Feed support will be provided to breeders registered in the Livestock Information System database, provided that it does not exceed the number of animals registered in the system and the upper limit

is determined by MAF" it was announced. Since it became impossible for producers to supply feed after the earthquake, the feed was procured from factories in neighboring provinces by MAF and delivered to the earthquake area. Feed resources such as alfalfa, silage, and hay were also supplied to the provinces affected by the earthquake to meet the roughage needs of the animals. The Meat and Milk Institution (MMI) purchased livestock from producers who were unable to care for their animals by paying a premium of 56 TL/kg over the carcass slaughter price of 116 TL per kg. From the date of the earthquake until March 2023, 700 bovines and 2,000 ovines were purchased by MMI. Additionally, 6,000 tons of milk were taken from the producers and delivered to dairy factories in the region (Anonymous, 2023a; Anonymous, 2024b; Anonymous, 2024c). The "Decree on the Measures Taken in the Field of Agriculture within the Scope of the State of Emergency" was published in the Official Gazette No. 32130 dated March 12, 2023, and entered into force; In the relevant decision, the detection of perished animals and sugar support for bee enterprises, etc issues were mentioned (Anonymous, 2023b). By MAF and affiliated organizations;

- Prevention of zoonotic diseases,
- Repair of damaged barns and sheepfolds, reconstruction of destroyed ones,
- Supplying roughage and concentrated feed, medicine, and vaccines to animal breeders,
- Compensating the damage caused by animal losses in a way that will enable breeders to purchase animals again,
- To encourage animal husbandry, MMI should operate more effectively in the region to solve marketing problems that may arise in animal products, etc many measures were tried to be implemented urgently (Anonymous, 2023a; Anonymous, 2024b; Anonymous, 2024c; Anonymous, 2024d).

After the earthquake, MAF provided information to farmers about the steps taken and to be taken in the earthquake region on its website. In this context, we see below the information provided and the steps taken regarding the disaster area. In the information dated 15-17-24-28 February 2023; "Measures Taken for Our Farmers Due to the Earthquake Disaster and Feed Support, Depositing the Support to Accounts" was mentioned. "During the year, 530 million TL worth of raw milk support, calf support, mother sheep-goat support, bovines fattening support, beehive support, herd enlargement and renewal support payments will be deposited into farmers' accounts in February 2023 and feed will be provided to 185 thousand enterprises for 10 provinces" it was announced (Anonymous, 2023c; Anonim, 2023d; Anonim 2023e; Anonim, 2023f). 29 May 2023, 20 July 2023, 08-17 August 2023; In the information dated 09 September 2023; "Ovine Distribution, Beehive Distribution, Poultry Distribution" has been announced. "Appropriations for the provision of animals have been sent to the provinces for the distribution in kind to our breeders whose ovine have perished, in place of their lost animals. It was announced that 43,317 ovines, 548,842 poultry, and 26,273 beehives were distributed in the following periods (Anonymous, 2023g; Anonymous, 2023h; Anonymous, 2023i; Anonymous, 2023j; Anonymous, 2023k).

In the news text titled "Minister Yumaklı, in the EXPO-2023-Kahramanmaraş Opening Speech" in the information dated October 15, 2023, Minister Yumaklı said, "15 percent of Turkey's agricultural product and one-seventh of our farmers are in the earthquake zone. Cash payments regarding the needs of our breeders were accelerated and 43.317 ovines, 15.200 of which were in Kahramanmaraş, were delivered to the producers in need. The distribution of 26.273 beehives and nearly 550.000 poultry, 5.750 of which are in Kahramanmaraş, has been completed. In addition, 5.809 bovines in the region, 1.767 of which are in Kahramanmaraş, will be given to breeders as soon as possible (Anonymous, 2023l). In the information dated February 4, 2024, it was stated that "Support Payment to Breeders Affected by the Earthquake" was made, and Minister Yumaklı said, "Bovines, ovines, poultry, and beehives costing a total of 909 million TL were delivered to our breeders free of charge. In addition, 5,358 tons of feeding sugar were given free of charge to beekeepers in the earthquake zone. Again, within the scope of animal husbandry, 1 billion 372 million TL feed support was provided to our breeders in the provinces affected by the earthquake. 5 million doses of bovine foot and mouth

vaccine, costing approximately 60 million TL, were administered free of charge in these provinces, which were declared disaster areas affecting public life" (Anonymous, 2024e). In this study, we tried to provide information about the status of livestock fattenings in Turkey, the place and substantiality of the earthquake-affected provinces in the country's livestock fattenings, the matters conversant after the earthquake in the region, the precautions taken, and recipe proposals.

2. Material and Method

Data on the number of animals used in the research were obtained from the web page of the Turkish Statistical Institute (TUIK). The formulas $Nca = (Nabe - Naae)$ and $Rca \% = Nca / Nabe * 100$ were applied to determine the changes and change rates in the number of animals before and after the earthquake. In this formula,

- **Nca**: Number of changes for the animal species,
- **Nabe**: Number of animals before the earthquake,
- **Naae**: Number of animals after the earthquake,
- **Rca %**: It expresses the ratio of change of the animal species.

3. Results and Discussion

Animal numbers in the last five years in the provinces affected by the earthquake, changes before the earthquake (year 2022) and after the earthquake (year 2023) are calculated and the change ratios (+/-) shown in Table 3, Table 4, Table 5, Table 6, Table 7, Table 8, Table 9, Table 10, Table 11, Table 12 and Table 13.

Table 3: Livestock activities of Adana province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying		Other Poultry	
				Hen	Turkey	Goose	Duck, Guinea f.
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	242.412	1.052.018	6.863.825	817.445	2.430	3.869	30.283
2023	248.047	944.939	7.674.465	944.743	2.631	3.637	27.598
Dhs*	5.635	-107.079	810.640	127.298	201	-232	-2.685
Dho** %	2,32	-10,18	11,81	15,57	8,27	-6,00	-8,87

Nca**: Number of changes per animal species, *Rca %**: Ratio of change for animal species

Table 4: Livestock activities of Adiyaman province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying		Other Poultry	
				Hen	Turkey	Goose	Duck, Guinea f.
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	100.618	333.505	80.000	100.240	3.803	3.300	1.555
2023	107.175	301.297	78.000	93.815	3.228	1.815	1.346
Dhs*	6.557	32.208	-2.000	-6.425	-575	-1.485	-209
Dho** %	6,52	-9,66	-2,50	-6,41	-15,12	-45,00	-13,44

Nca**: Number of changes per animal species, *Rca %**: Ratio of change for animal species

While there was a 2.32% increase in the number of cattle in Adana, the number of ovines was reduced by 10.18%, and broiler and laying hens were raised by 11.81% and 15.57%, respectively. In other poultry, no significant change was observed in total. While there was a 6.52% increase in the number of bovines in Adiyaman, there were significant losses in all other animal assets compared to the pre-earthquake period. Diyarbakir is one of the most important provinces where livestock activities are carried out in the earthquake region. It is the second province after Şanlıurfa in terms of the number of ovines. While there were no significant changes in the presence of bovines and ovines,

there was an increase of 58.90% in broiler, 21.21% in laying hens, 65.99% in turkey, and 68.36% in goose production.

Table 5: Livestock activities of Diyarbakır province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Turkey	Other Poultry	
						Goose	Duck, Guinea f.
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
2021	608.214	2.209.368	162.128	683.363	462.601	65.342	23.209
2022	582.935	2.085.941	170.166	677.578	257.724	64.919	22.764
2023	580.835	2.070.682	270.400	533.880	87.658	20.542	28.671
Dhs*	-2.100	-15.259	100.234	-143,698	-170,066	-44.377	5.907
Dho** %	-0,36	-0,73	58,90	-21,21	-65,99	-68,36	25,95

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

In Elazığ, there were significant losses in the presence of bovines and ovines (7.28% and 8.10%), and an increase of 345.80% in goose breeding was recorded. No significant changes were observed in other livestock activities. While there were no significant changes in the presence of bovines and ovines in Gaziantep, there was an increase of 11.75% in broiler and a reduction of 28.04% in turkey production. In Hatay, there was a decrease of 7.23%, 13.57%, and 15.65% in the number of ovines, broiler, and laying hens, respectively, and a reduction of 18.96% in goose breeding. In Kahramanmaraş, there was an 8.12% increase in the presence of bovines and a 5.85% reduction in the presence of ovines, while an increase of 29.19% and 13.83% in broiler and laying hens were observed, respectively.

Table 6: Livestock activities of Elazığ province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Turkey	Other Poultry	
						Goose	Duck, Guinea f.
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	170.471	924.201	5.748.638	1.626.920	28.825	7.377	1.216
2023	158.068	849.314	5.717.290	1.602.460	29.870	32.887	1.409
Dhs*	-12.403	-74.887	-31.348	-24.460	1.045	25.510	193
Dho** %	-7,28	-8,10	-0,55	-1,50	3,63	345,80	15,87

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Table 7: Livestock activities of Gaziantep province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Turkey	Other Poultry	
						Goose	Duck, Guinea f.
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	197.073	851.390	400.600	6.117.889	11.578	2.540	2.315
2023	200.952	845.036	447.682	6.305.371	8.332	2480	2.197
Dhs*	3.879	-6.354	47.082	187.482	-3.246	-60	-118
Dho** %	1,97	-0,75	11,75	3,06	-28,04	-2,36	-5,10

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

In Kilis, there were losses of 25.59% in ovines, 11.68%, and 15.49% in broiler and laying hens. While a partial increase was observed in the number of bovines and ovines in Malatya, a reduction of 9.40% and 2.88% was recorded in broiler and laying hens. In Osmaniye, there was a reduction of 7.23% in ovines, 13.57% and 15.65% in broiler and laying hens, and 18.96% in geese.

Table 8: Livestock activities of Hatay province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Other Poultry
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					Turkey	Goose	Duck, Guinea f.
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	141.444	558.609	652.000	362.514	1.570	5.692	4.383
2023	141.683	518.218	563.500	305.773	1.913	4.613	4.154
Dhs*	239	-40.391	-88.500	-56.741	343	-1.079	-229
Dho** %	0,17	-7,23	-13,57	-15,65	21,85	-18,96	-5,22

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Table 9: Livestock activities of Kahramanmaraş province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Other Poultry		
					Turkey	Goose	Duck, Guinea f.
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	214.117	1.052.149	328.984	1.004.416	17.841	10.222	7.846
2023	231.500	990.593	425.001	1.143.278	18.121	9.442	7.500
Dhs*	17.383	-61.556	96.017	138.862	280	-780	-346
Dho** %	8,12	-5,85	29,19	13,83	1,57	-7,63	-4,41

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Table 10: Livestock activities of Kilis province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Other Poultry		
					Turkey	Goose	Duck, Guinea f.
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	11.698	239.451	214.000	88.100	2.110	560	290
2023	12.073	178.181	189.000	74.452	1.685	566	199
Dhs*	375	-61.270	-25.000	-13.648	-425	6	-91
Dho** %	3,21	-25,59	-11,68	-15,49	-20,14	1,07	-31,38

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Table 11: Livestock activities of Malatya province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Other Poultry		
					Turkey	Goose	Duck, Guinea f.
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	173.820	369.262	5.828.188	875.310	3.720	2.071	1.255
2023	178.130	382.803	5.280.551	850.128	4.232	2.209	1.575
Dhs*	4.310	13.541	-547.637	-25.182	512	138	320
Dho** %	2,48	3,67	-9,40	-2,88	13,76	6,66	25,50

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Şanlıurfa is the province with the most considerable ovines population in the region. While there was a decrease of 4.40% and 2.48% in the presence of ovines and bovines, there was a rise of 7.28% in laying hens and 7.03% in turkey breeding.

Table 12: Livestock activities of Osmaniye province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Turkey	Other Poultry Goose	Duck, Guinea f.
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	62.610	237.386	790.578	317.605	1.333	2.804	1.713
2023	67.609	216.422	834.000	290.164	1.075	1.429	678
Dhs*	239	-40.391	-88.500	-56.741	343	-1.079	-229
Dho** %	0,17	-7,23	-13,57	-15,65	21,85	-18,96	-5,22

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

Table 13: Livestock activities of Şanlıurfa province in the last five years (Number of animals) (TUIK, 2024)

Years	Bovine	Ovine	Broiler	Laying Hen	Turkey	Other Poultry Goose	Duck, Guinea f.
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	321.989	2.325.456	40.000	607.941	38.332	8.115	4.712
2023	314.018	2.223.195	40.000	652.220	41.028	8.030	4.635
Dhs*	-7.971	-102.261	0	44.279	2.696	-85	-77
Dho** %	-2,48	-4,40	0	7,28	7,03	-1,05	-1,63

*Nca: Number of changes per animal species, **Rca %: Ratio of change for animal species

The changes in the numbers of bovines, ovines, broilers, and laying hens in the earthquake region are shown in the graphs in Figure 1, Figure 2, Figure 3, and Figure 4, respectively.

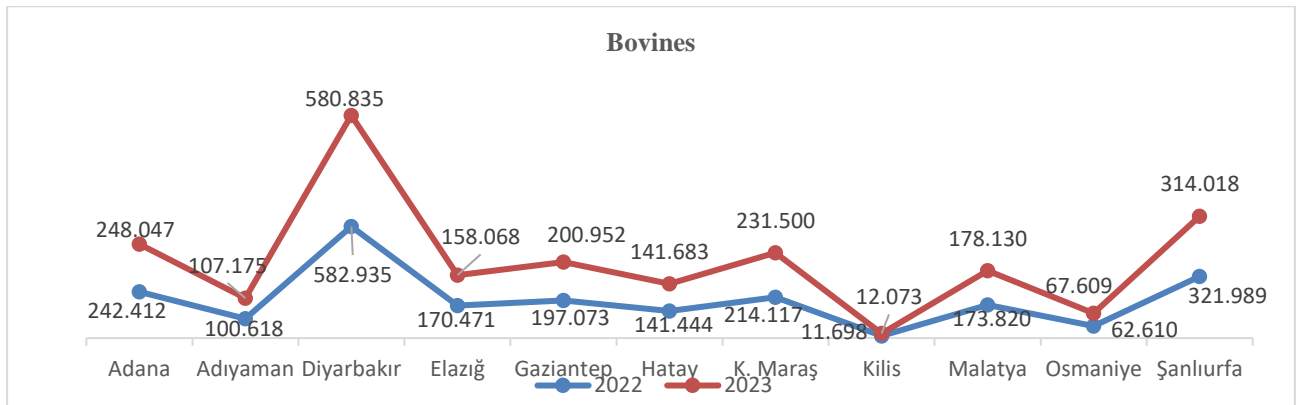


Figure 1: Numbers of bovines between 2022-2023

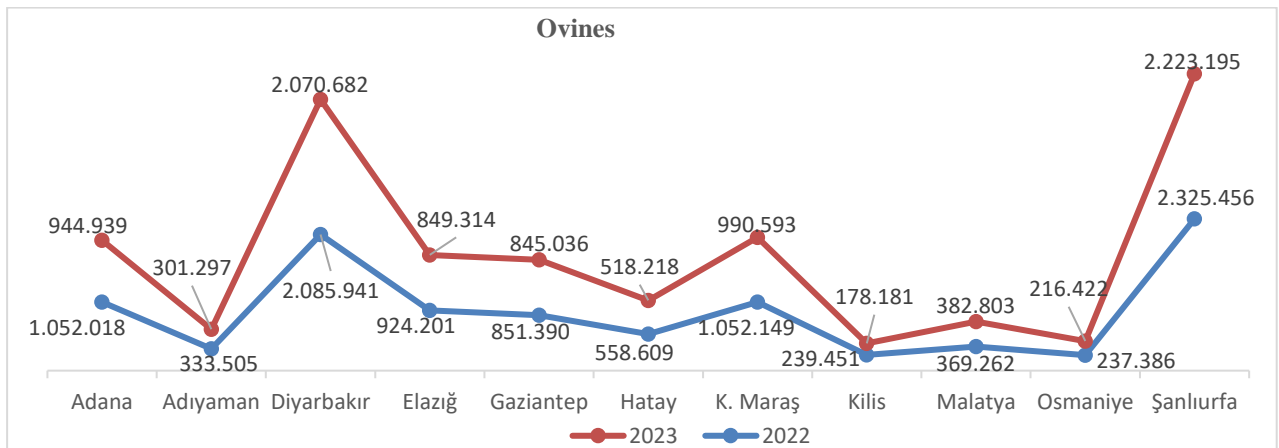


Figure 2: Numbers of ovines between 2022-2023

When the livestock activities of the provinces affected by the earthquake before and after the earthquake were examined, it was seen that there were no significant changes in the presence of bovines in general, but there was a decrease in the presence of ovines in all provinces except Malatya. In terms of ovines population, Şanlıurfa, Diyarbakır, Adana and Kahramanmaraş, Elazığ and Gaziantep are the leading provinces of the earthquake zone. According to the data obtained after the earthquake in the specified provinces, it was observed that there was a significant decrease in the presence of ovines. Likewise, while there were decreases in the presence of ovines in other provinces, there was a rise of 3.67% in Malatya. In broiler breeding, respectively there was an increase of 58.90%, 29.19%, 11.81%, 11.75%, and 5.49% in Diyarbakır, Kahramanmaraş, Adana, Gaziantep, and Osmaniye, it was decreased 13.57% in Hatay, 11.68% in Kilis, and 9.40% in Malatya. Although the increase in laying hen production by 15.57% in Adana, 13.83% in Kahramanmaraş, and 7.28% in Şanlıurfa, it was seen a decrease of 21.21% in Diyarbakır, 15.65% in Hatay, 15,49% in Kilis and 8,64% in Osmaniye. There has been an important rise/reduction in the number of other poultry animals, including turkey, goose, duck, and guinea fowl. In Diyarbakır, which is the leading province in the region's turkey, goose, duck, and guinea fowl production, there was a decrease of 68.36% and 65.99% in goose and turkey production, respectively, while duck and guinea fowl production rose by 25.95%.

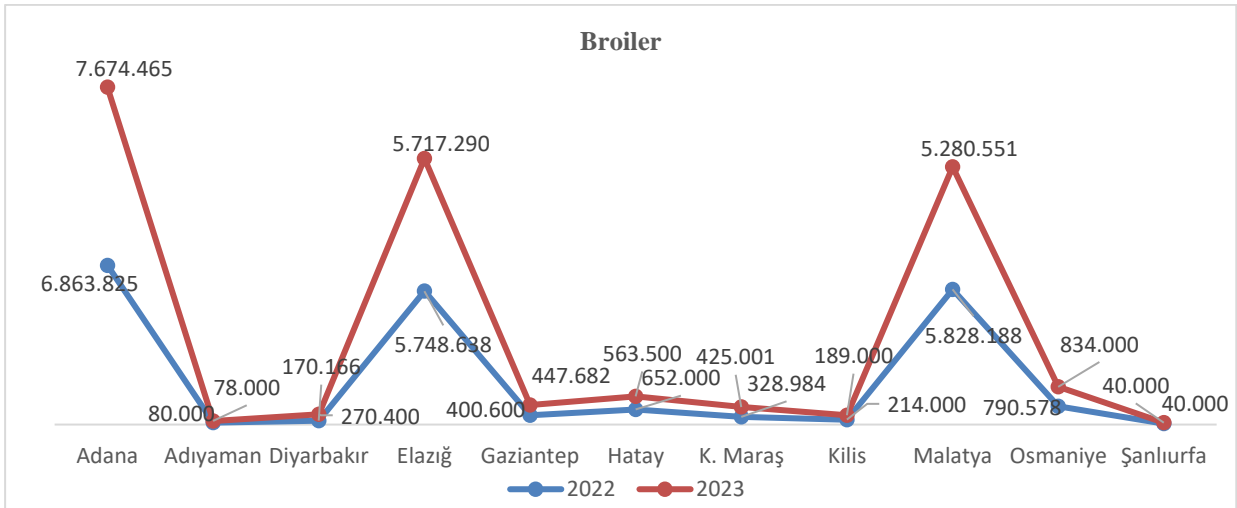


Figure 3: Numbers of broiler between 2022-2023

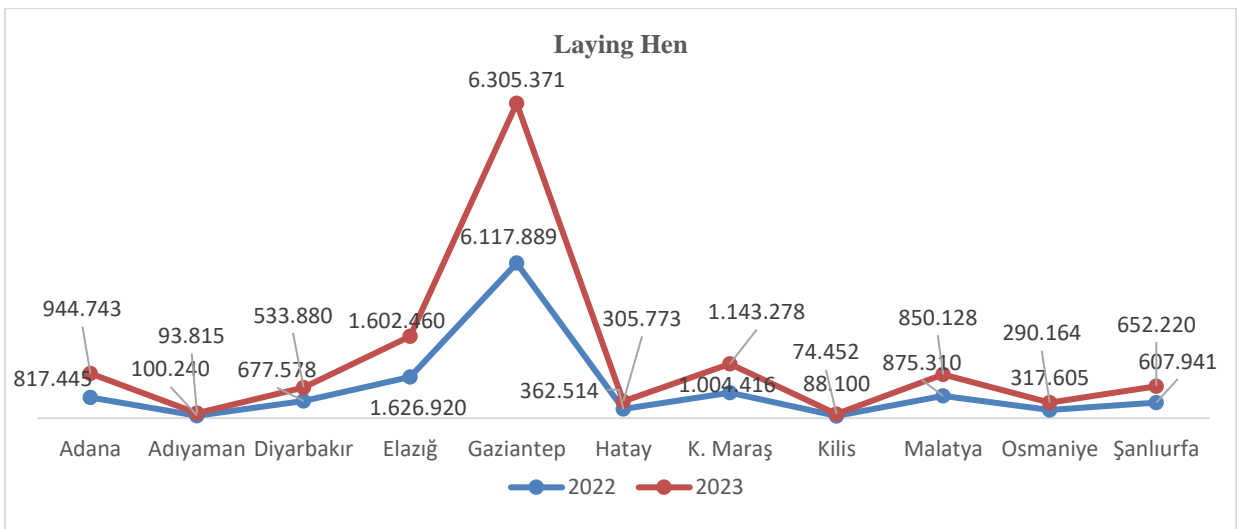


Figure 4: Numbers of laying hens between 2022-2023

When a brief review of the pre-earthquake situation of the crop production and livestock sectors to ensure a sustainable production environment by delivering on time damage in earthquake provinces rehabilitating or rebuilding all agricultural infrastructure that reduces livestock losses to be met by substituting, to minimize public effectiveness in agrarian marketing in order to increase and reduce the negative impact of migration from the region on agricultural production encouraging employment of agricultural workers and preventing farmers from giving up production necessary measures must be taken to ensure (Ağızan et al., 2023). In the past, Turkey resorted to imports when there were declines in livestock activities or when animal products could not meet the excessive demand. As a result of efforting to unfasten the problems of the sector with imports after the earthquake, it became hard to bring the producers who quit animal husbandry back into livestock (Karakuş, 2011). High prices of raw materials, which are the most important input of the sector, increase costs and thus cause animal products to become more expensive, disrupting the supply/demand balance and, as a result, hindering the development of the sector. In this context, it was an important step for MAF to immediately provide feed support to breeders. Delays in transportation to rural areas during the earthquake revealed that a special structure should be established in the villages to quickly solve the problems in case of similar disasters. Akin (2023) stated that the presence of structures such as the rural intervention unit affiliated with AFAD could help in this regard. Akin (2023) stated that an institutional structure such as the General Directorate of Rural Services, which operated in Turkey in the past years and was closed in 2005, could provide effective intervention in similar situations.

As a result of the literature review, it was seen that there is no sufficient scientific study on the effects of earthquakes on the livestock sector. Bachey and Ito, (2017) stated that the earthquake with a magnitude of Mw=9.0 that occurred in Tohoku, Japan, on March 11, 2011, caused serious damage to the agricultural sector. Researchers reported that after the earthquake in Japan, significant damages occurred in the agriculture, hunting, and forestry sectors, and approximately 4,550,000 poultry, 5,850 pigs, and 750 beef cattle perished in Aomori, Iwate, and Miyagi prefectures. The earthquake with a magnitude of Mw=7.6 that occurred in Kathmandu, Nepal, on April 25, 2015, and the subsequent aftershocks, had serious effects on the country's agriculture and agricultural biodiversity. Approximately 135,200 tons of food, 16,399 bovines, 36,819 ovines, and 60,762 poultry were lost. It was stated that the maximum loss was experienced in mountainous regions (86%), and the total loss was at the level of 255 million USD (NPC, 2015; Rasul et al. 2015; Gauchan et al., 2017). Gauchan et al., (2017) reported that following the earthquake in Nepal, animal feed, livestock, poultry, fish farms, animal feed stocks, egg and honey production, and stored foods were the most affected agricultural products, and only feed and reported that policies regarding premium payments per animal were given priority. It was noted that after the disaster in Japan, many difficulties continued, especially for small and medium-sized companies, and there were problems in sectors such as agriculture, fisheries, and food processing (Bachey and Ito, 2017). Similarly, after the earthquake in Turkey, organizations such as associations of which producers and animal breeders are members tried to express their problems in the press (Anonymous, 2023m).

In this context, MAF has taken steps to eliminate the problems experienced in the earthquake region by providing cash and in-kind aid to growers (Anonymous, 2023a; Anonymous, 2023b; Anonymous, 2023c; Anonymous, 2023d; Anonymous, 2023e; Anonymous, 2023f; Anonymous, 2023g; Anonymous, 2023i; Anonymous, 2023k; Anonymous, 2024d). It has been stated that even in Japan, which has a developed economy, only 45% of companies can reach the pre-earthquake level 6 years after the disasters. It has been reported that the total production value of agricultural, forestry, and fishing products in Fukushima decreased significantly (Bachey and Ito, 2017). Turkey, one of the countries with a developing economy, is likely to experience the negative effects of the earthquake in the livestock sector for a long time. When we look at the number of animals before and after the earthquake, it can be said that MAF is trying to protect animal existence. Total crop and livestock damages resulting from the 2011 earthquake in disaster areas in Japan were estimated at 14.2 billion yen. One year after the disasters, approximately 78% of surveyed meat animal breeders and nearly half of mushroom and dairy producers declared that they were seriously damaged by disasters (Bachey and Ito, 2017). After the earthquake in Japan, experts emphasized the importance of constantly

examining the effects and factors of disasters on society, disaster management, and post-disaster reconstruction, communicating the obtained information to the public and passing it on to the next generations (Bachey and Ito, 2017). Akin (2023) pointed out that although it is not possible to stop natural disasters, every country should learn from past disasters by seeing their shortcomings and transferring their experiences to future generations.

4. Conclusion

When the livestock activities of the provinces affected by the earthquake before and after the earthquake are examined, it can be seen that generally there were no significant changes in the presence of bovines, and there was a decrease in the presence of ovines in all provinces except Malatya. In terms of ovines population, Şanlıurfa, Diyarbakır, Adana and Kahramanmaraş, Elazığ and Gaziantep are the leading provinces of the earthquake region. According to the data obtained after the earthquake in the specified provinces, it was observed that there was a significant reduction in the presence of ovines. In broiler breeding, respectively while there was an increase compared to before the earthquake in Diyarbakır, Kahramanmaraş, Adana, Gaziantep, and Osmaniye, there was a reduction in Hatay, Kilis, and Malatya. While there was an increase in laying hen production in Adana, Kahramanmaraş, and Şanlıurfa, there was a decrease in Diyarbakır, Hatay, Kilis, and Osmaniye. Diyarbakır is the leading province in the region's turkey, goose, duck, and guinea fowl production. While there was a reduction in goose and turkey production, respectively, there was an increase in duck and guinea fowl production. MAF tried to prevent losses in livestock and withdrawal from production with cash and in-kind aid. In the future, it is vital for the sustainable livestock activities of the region that investments, loans, and incentive packages in the earthquake region are among the priority policies of the Ministry.

Acknowledgments or Comments

This study is outside the scope of the "*Ethics Committee Decision*".

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