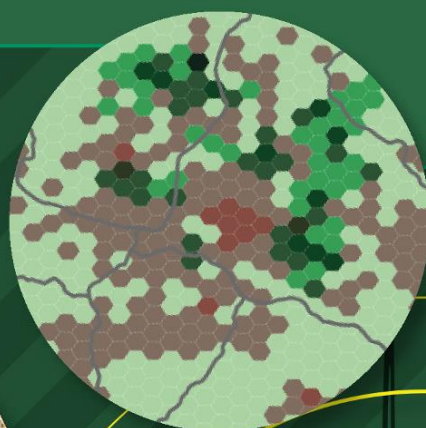
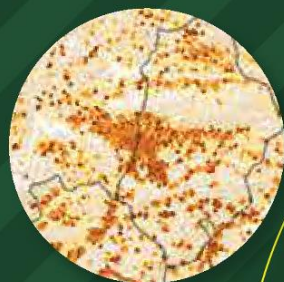




Food and Agriculture  
Organization of the  
United Nations



# Rapid geospatial assessment after **the earthquake in Türkiye** in 2023

Impacts on infrastructure and farming community  
during the period February–March 2023

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**Impacts on infrastructure and farming community during the period February–March 2023**

By

Gautam Dadhich, Hesham Aboelsoud, Amit Ghosh, Fatima Mushtaq, Shrijwal Adhikari, Cagatay Cebi, Aysegul Selisik, Ismet Yalcin, Kerem Demirel, Fatih Bayrakm Adem Seker, PeterJohn Agnew, Neil Marsland, Oriane Turot, Ertan Aktan Daniele Barelli, Joelle Zeitouny, and Matieu Henry.

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# Executive summary

Türkiye is located in an active seismic zone, and earthquakes are not uncommon in the country. The government and local authorities have taken measures to strengthen buildings and infrastructure in order to minimize the risk of damage from earthquakes, but the region remains vulnerable to seismic activity. Geospatial data from publicly available satellite imageries, very high-resolution aerial photographs, and information from national portals were collected and analyzed to assess the impact of the earthquake. The data were processed and analyzed using geospatial cloud computing tools.

A rapid geospatial assessment has been conducted to assess the impact of the earthquakes on the agricultural sector. Administrative boundary layer from Global Administrative Areas (GADM), Humanitarian Data Exchange (HDX) and Global Administrative Unit Layers (GAUL) are compared, and HDX was chosen as the data source for the assessment because it provided updated and better detailed administrative information. Land cover legend for Türkiye was derived from FAO land cover registry (2016) (Gregorio, 2016). The land cover dataset was prepared using 2022 satellite imageries (Sentinel-1 & 2), around 700 training data, and a random forest model in SEPAL. The spatial resolution of the land cover data is 10 m. A damage proxy map on infrastructures for Türkiye was obtained from the Earth observatory, Singapore, which was overlaid to the settlement distribution from Atlas of Human Settlement (2022) and used for the assessment. Population data (Worldpop, 2020), land cover and derived damage proxy map (Earth observatory, Singapore) were combined to help identifying areas with a potentially high number of affected people. The extent of irrigated cropland was prepared based on the Sentinel 2 based land cover map for 2022. This indicator helps identifying areas with a potentially higher degree of dependency on irrigated cropland to estimate the exposure to earthquake damages. Proxy indicator of exposure of agricultural sector was prepared by combining land cover, cropland, derived damage proxy map (Earth observatory, Singapore), The proxy indicator helps identifying areas with a potentially higher degree of farmers' exposure to earthquake damages. Deformation map was prepared by using multiple pre and post event sentinel 1 time series images to estimate the horizontal displacement. This indicator helps identifying areas with a potentially impacted aquifer system to earthquake damages. High displacement zones correspond to higher impact on aquifer systems due to compaction and leakage. The locations livestock enterprises and damage proxy map were overlaid to stratify locations of irrigation infrastructure based on earthquake damage magnitude. Humanitarian Data Exchange (HDX) boundaries (UNOCHA, 2020) were used to extract the statistics at the sub-district levels.

This report provides results on (1) damage proxy map (2) exposed population, (3) farmers exposure to earthquake, (4) map of cultivated land with 3 classes at 10 m resolution (Horticulture, Rainfed and irrigated), (5) Impacted agriculture infrastructure, (6) deformation map. The results are provided in the form of maps by administrative units and tabular with descriptive statistics for the various indicators mentioned above. With recent advances in geospatial and information technologies, updated land cover, crop specific information adapted to the national conditions with tailored field campaigns have the potential to better support response programmes and agricultural development in the future.

# Background

An earthquake is a sudden and rapid shaking of the earth's crust caused by the release of energy stored in rocks. Earthquakes can range in size from small tremors to large events that cause significant damage and loss of life. According to the United States Geological Survey (USGS), there are an estimated 500 000 detectable earthquakes in the world each year, with around 100 000 of them large enough to be felt. The largest earthquake ever recorded was a magnitude 9.5 event that occurred in Chile in 1960 (USGS, 2006).

Earthquakes are caused by the movement of tectonic plates, which are large pieces of the earth's crust that float on the molten rock of the mantle. When two plates move against each other, pressure builds up along the fault line, and when this pressure is released, it causes an earthquake. Seismic waves generated by an earthquake can travel through the earth's crust and cause shaking, ground displacement, and other forms of damage. The severity of an earthquake is measured using the Richter scale, which assigns a numerical value to the amount of energy released by the earthquake (Basti, 2018).

Earthquake impact assessment is a critical process that involves evaluating the potential consequences of an earthquake on the environment, infrastructure, and human life. The assessment aims to provide decision-makers with information that can help them make informed decisions and take proactive measures to mitigate the impact of an earthquake . Hazard identification and mapping involves identifying areas that are at risk of earthquakes and mapping out the potential impacts of an earthquake, such as ground shaking, liquefaction, and landslides. Overall, earthquake impact assessment is a critical component of disaster risk reduction and can help communities and decision-makers better prepare for and respond to earthquakes (Debbarma and Debnath, 2021; reliefweb, 2023)

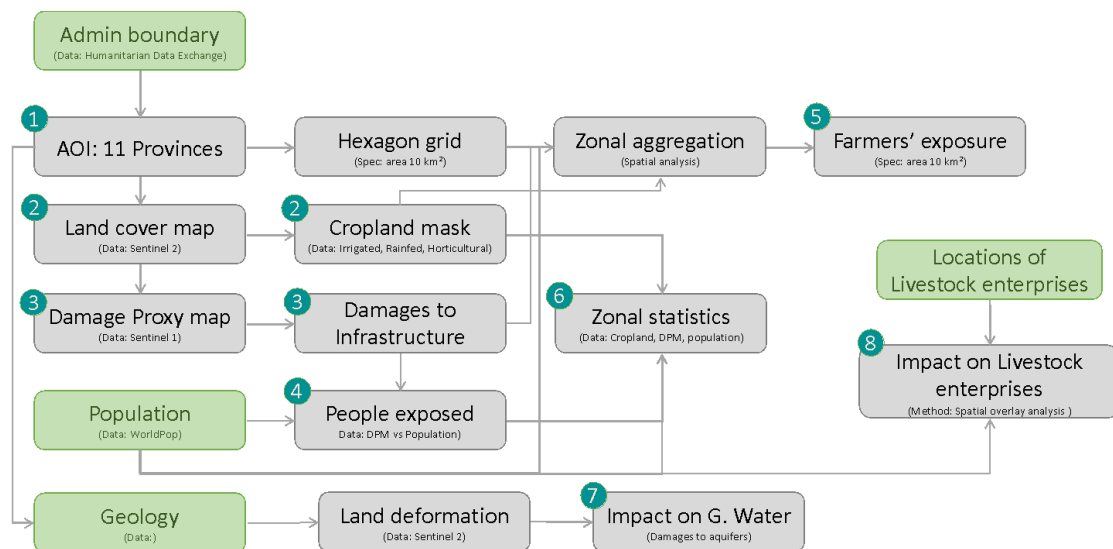
On 6 February 2023 at 4.17 am local time, a 7.8-magnitude earthquake occurred near the city of Gaziantep in southern Türkiye. Its tremors were felt in the provinces of Syria, Lebanon, Cyprus and Iraq. The objectives of this rapid geospatial emergency impact assessment, considering the limited time and information available to conduct this assessment, are to (1) assess damage extent and magnitude, (2) identify affected cropland, (3) assess exposure of farmers to earthquake and (4) provide the results in support to regional, national and local response actors. Available data, and without access to field information, within the period to conduct the assessment may have not captured all kind of damages such as related to earthquake (reliefweb, 2023).



# Methodological approach

The following methodological approach was followed to provide results for this rapid geospatial impact assessment.

Figure 1 Methodological diagram for the earthquake impact assessment in Türkiye



Source: Authors' own elaboration.

## Step 1: Selection of areas of interest (AOI)

The selection of the AOIs is based on the damage proxy map derived from Earth Observatory of Singapore - Remote Sensing (EOS-RS) (Lauriane CHARDOT, 2023) to prioritize areas where earthquake have mostly impacted. Administrative boundary layer from Global Administrative Areas (GADM), Humanitarian Data Exchange (HDX) (UNOCHA, 2020), UNOCHA and Global Administrative Unit Layers (GAUL) are compared, and HDX, UNOCHA was chosen as the data source for the assessment because it provided updated and better detailed administrative information. Administrative boundaries at the regional level were used to define the AOI at the national level, while administrative boundaries at the district level were used to define the AOIs at the subnational level.

## Step 2: Preparation of land cover map

Land cover legend for Türkiye was obtained from Konya Land Cover Legend (FAO, 2016). A land cover was prepared at the subnational level using Sentinel 1, Sentinel 2 and Norway's International Climate & Forests Initiative (NICFI) Planet data, with training data from a high-resolution base map. A normalized difference vegetation index (NDVI) mask for the whole year 2022 was used to delineate the cultivated area mask. The land cover dataset was prepared using 2022 satellite imageries (Sentinel-1 & 2), around 700 training data, and a random forest model in SEPAL. The spatial resolution of the land cover data is 10 m. Time series profile of Normalized Difference Vegetation Index (NDVI) of whole year 2022 is used to classify horticulture, irrigated and rainfed cropland area.

Land cover map covers 9 different classes which includes built-up areas, bare areas, forest, irrigated field crops, horticultural crops, rainfed field crops, grasses and shrubs, and waterbodies.

### **Step 3: Derivation of damage proxy maps (DPM)**

DPM uses the so-called Coherence Change Detection (CCD) algorithm based on Sentinel-1 SAR data (Smail *et al.*, 2022) to produce damage proxy maps at 30m pixel size. Data is reliable over built-up areas by detecting severe building collapse. DPM was derived from synthetic aperture radar (SAR) images acquired by the Copernicus Sentinel-1 and ALOS 2 satellites before (13 Oct 2022 to 29 Jan 2023) and after (10 Feb 2023) the event. The data were masked using Built-up areas from Dynamic world land cover maps.

### **Step 4: Assessment of population exposure**

Population exposure was estimated using the damage proxy map (DPM) and Worldpop population data at the national level. The DPM layer was overlaid on the population layer to estimate the exposure as an amount of per capita on earthquake affected areas. The percentage of the population exposed to earthquake for each administrative boundary is calculated using the total population of the area being assessed.

To estimate the population affected by an earthquake using these two datasets, you can follow these steps:

- Determine the spatial extent of the earthquake damage proxy map. This will give you a polygon or set of polygons that represent the areas that were impacted by the earthquake.
- Overlay the WorldPop population density dataset on top of the earthquake damage proxy map. This will allow you to determine the population density of the affected areas.
- Calculate the total population in the affected areas by multiplying the population density by the area of each polygon in the earthquake damage proxy map.
- Adjust your estimate based on the severity of the damage in each area. For example, if an area has high damage severity, you may assume that the population in that area is more likely to be displaced than in areas with lower damage severity. You can use your expert knowledge and judgment to make these adjustments.
- Sum up the total populations of all affected areas to get an estimate of the total population affected by the earthquake.

It's important to note that these estimates are just that - estimates. The actual number of people affected by an earthquake may vary depending on a variety of factors, including the accuracy of the data, the intensity of the earthquake, and the specific characteristics of the affected population.

### **Step 5: Classification of hexagon grids by extent of irrigated cropland**

Irrigated crop land classes are extracted from land cover map. For better representation and visualization, Level-3 admin boundaries are further broken down into 10Km2 hexagon grid. Hexagons have a lower max distance between members and considering spatial autocorrelation, they may be more alike and better representatives of the group.

Pixels of irrigated cropland classes are aggregated by hexagon using mean reduction. Each input pixel is converted to a 'hex coordinate' and a unique ID is computed from those.

Hexagonal grids are different from administrative boundaries in terms of their shape, size, and function. Administrative boundaries are typically defined by political or administrative entities, such as countries, states, provinces, or municipalities, and are usually irregular in shape, following geographic features like rivers, mountains, or historical borders. These boundaries are used to define jurisdictional authority and to organize government services, elections, and census data. In contrast, hexagonal grids are regular in shape, with each hexagon having six sides of equal length and six angles of 120 degrees. Hexagonal grids are often used in GIS for spatial analysis, as they provide a uniform and standardized way of dividing a geographic area into smaller units that can be easily analyzed and compared. Hexagonal grids are particularly useful for analyzing spatial patterns and distributions, such as identifying hotspots of crime or disease, or monitoring changes in land use or habitat fragmentation.

#### **Step 6: Zonal statistics using damage proxy map and irrigated cropland**

The irrigated cropland mask and damage proxy map were overlaid to map the farmers exposure to earthquake. Humanitarian Data Exchange (HDX) boundaries (UNOCHA, 2020) were used to extract the statistics at the sub-district levels.

#### **Step 7: Preparation of deformation map**

Land deformation map was prepared by using multiple pre and post event sentinel 1 time series images to estimate the horizontal displacement. This indicator helps identifying areas with a potentially impacted aquifer system to earthquake damages. High displacement zones correspond to higher impact on aquifer systems due to compaction and leakage.

#### **Step 8: Impact on livestock enterprises**

The locations livestock enterprises and damage proxy map were overlaid to stratify locations of irrigation infrastructure based on earthquake damage magnitude. Humanitarian Data Exchange (HDX) boundaries (UNOCHA, 2020) were used to extract the statistics at the sub-district levels.

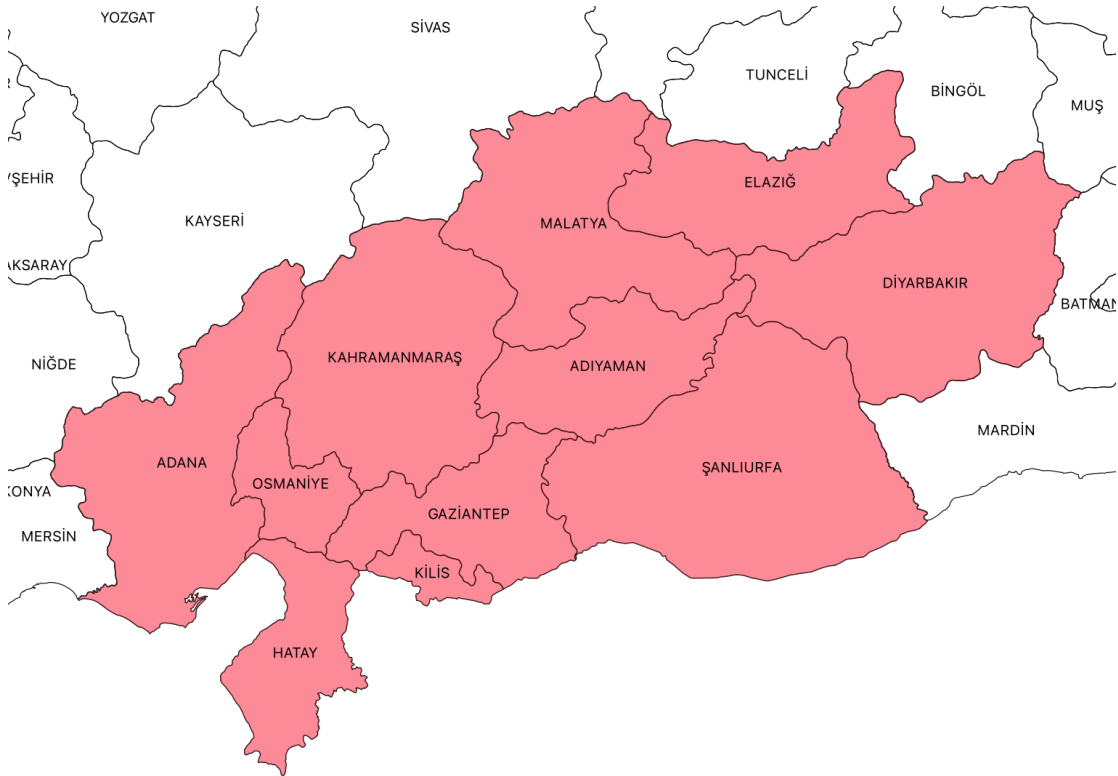
Results of all indicators are shared in five different formats, 1- maps in jpeg/ png, 2- geospatial data in tiff/ shp 3-geospatial data in KMZ, 4-tabular data on zonal statistics in csv and 5-one pagers in pdf.

# Results

## Result 1: Area of interest (AOI)

Earthquake that occurred during February 2023 in Southeast part of Türkiye were mapped and their impacts on agriculture as well as the population exposure were assessed for national and subnational level using United Nations Second Administrative Level from Humanitarian Data Exchange (HDX, 2020). Administrative boundary layer from Global Administrative Areas (GADM), Humanitarian Data Exchange (HDX) and Global Administrative Unit Layers (GAUL) are compared, and HDX was chosen as the data source for the assessment because it provided updated and better detailed administrative information.

*Figure 2 Area of interest at district level in Türkiye*



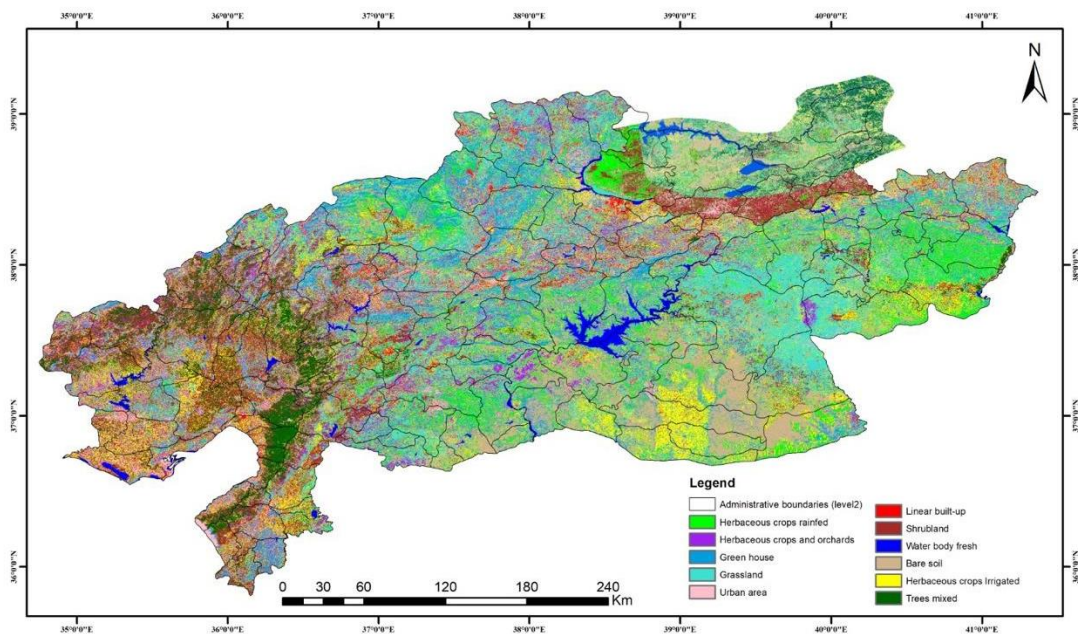
Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 2: Land cover

Land cover legend for Türkiye was derived from Konya Land Cover Legend (FAO, 2016). A land cover was prepared at the subnational level using Sentinel 1, Sentinel 2 and Norway's International Climate & Forests Initiative (NICFI) Planet data, with training data from a high-resolution base map. A normalized difference vegetation index (NDVI) mask for the whole year 2022 was used delineate the cultivated area mask. The land cover dataset was prepared using 2022 satellite imageries (Sentinel-1 & 2), around 700 training data, and a random forest model in SEPAL. The spatial resolution of the land cover data is 10 m. Time series profile of Normalized Difference Vegetation Index (NDVI) of whole year 2022 is used to classify horticulture, irrigated and rainfed cropland area. Land cover map covers 9 different classes which includes built-up areas, bare areas, forest, irrigated field crops, horticultural crops, rainfed field crops, grasses and shrubs, and waterbodies.

Land cover map at national and sub-national levels for specified AOI have been prepared. Zonal statistics were extracted based on the HDX administrative boundaries. The area of all land cover classes at district level is shown in table-2 of Annex-I.

*Figure 3 Land cover map of affected areas in 2022 in Türkiye*

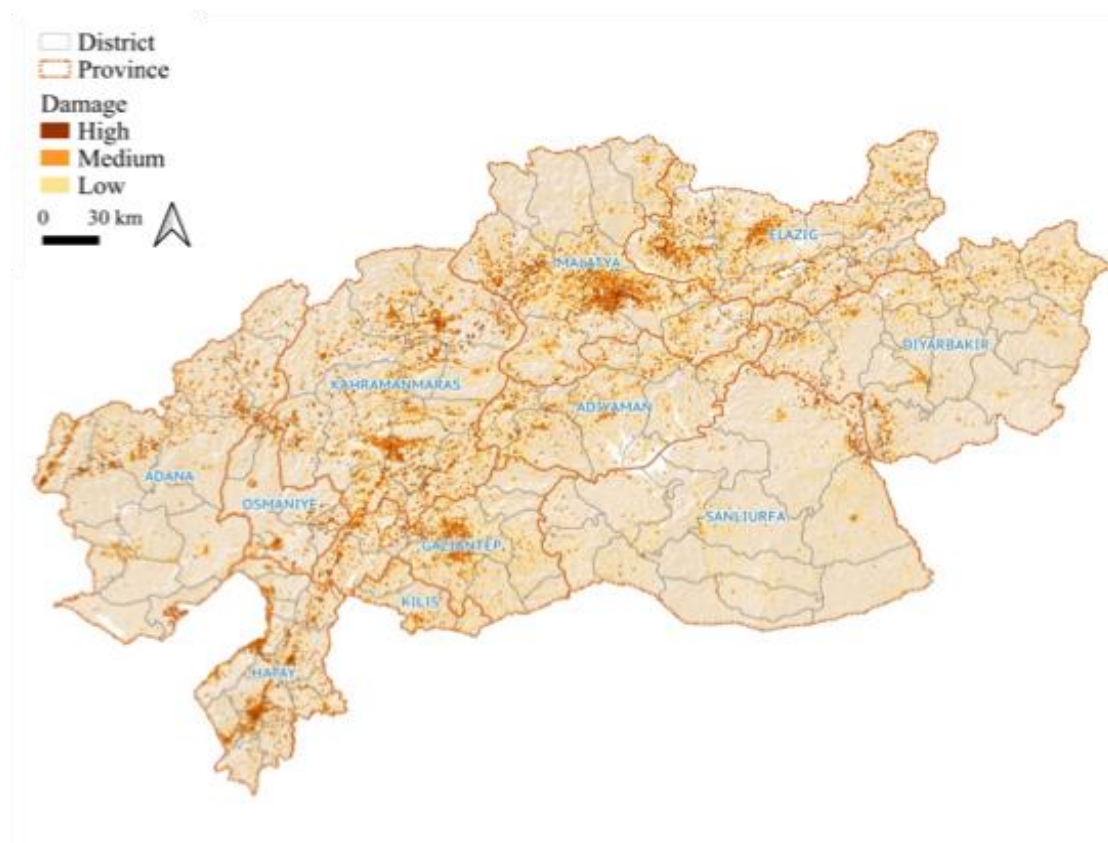


Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 3: Damage proxy map

DPM uses the Coherence Change Detection (CCD) algorithm based on Sentinel-1 SAR data (Tay et al. 2020) to produce damage proxy maps at 30m pixel size. Data is reliable over built-up areas by detecting severe building collapse. DPM was derived from synthetic aperture radar (SAR) images acquired by the Copernicus Sentinel-1 and ALOS 2 satellites before (13 Oct 2022 to 29 Jan 2023) and after (10 Feb 2023) the event by EOS-RS Lab (Lauriane CHARDOT, 2023). The data were masked using Built-up areas of land cover maps. A damage proxy map on infrastructures for Türkiye was obtained from the Earth observatory, Singapore. Population data (Worldpop, 2020) land cover and derived damage proxy map (Earth observatory, Singapore) were combined to help identifying areas with a potentially high number of affected people. Details are in table-1 of annex 1 for all regions.

Figure 4 Damage proxy map of 2023 earthquake in Türkiye

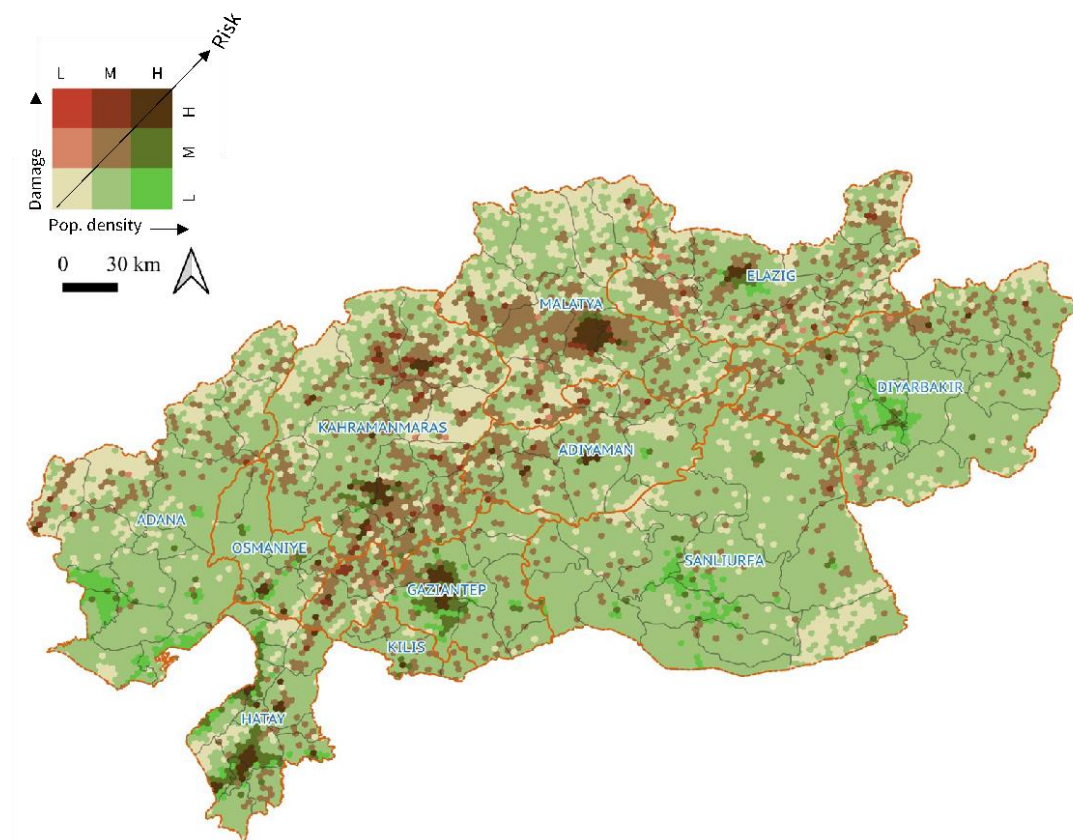


Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 4: Exposure of people

Due to the limitations in the data, a vulnerability assessment for the population exposed to earthquake was conducted. This considers the damage magnitude and the population density by administrative levels. It is assumed that the more people surrounded by earthquake impacted areas, the greater the vulnerability. This vulnerability assessment does not consider cropland information considering that damage proxy map is only valid for built up areas. Population data (Worldpop, 2020), land cover and derived damage proxy map (Earth observatory, Singapore) were combined to help identifying areas with a potentially high number of affected people. The DPM layer was overlaid on the population layer to estimate the exposure as an amount of per capita on earthquake affected areas. The percentage of the population exposed to earthquake for each administrative boundary is calculated using the total population of the area being assessed. The map illustrates the percentage of population exposed to earthquake. Different levels of exposure are indicated by differences in colour. Details are in table-3 of annex 1 for all regions.

Figure 5 Exposure of people during earthquake in Türkiye, 2023

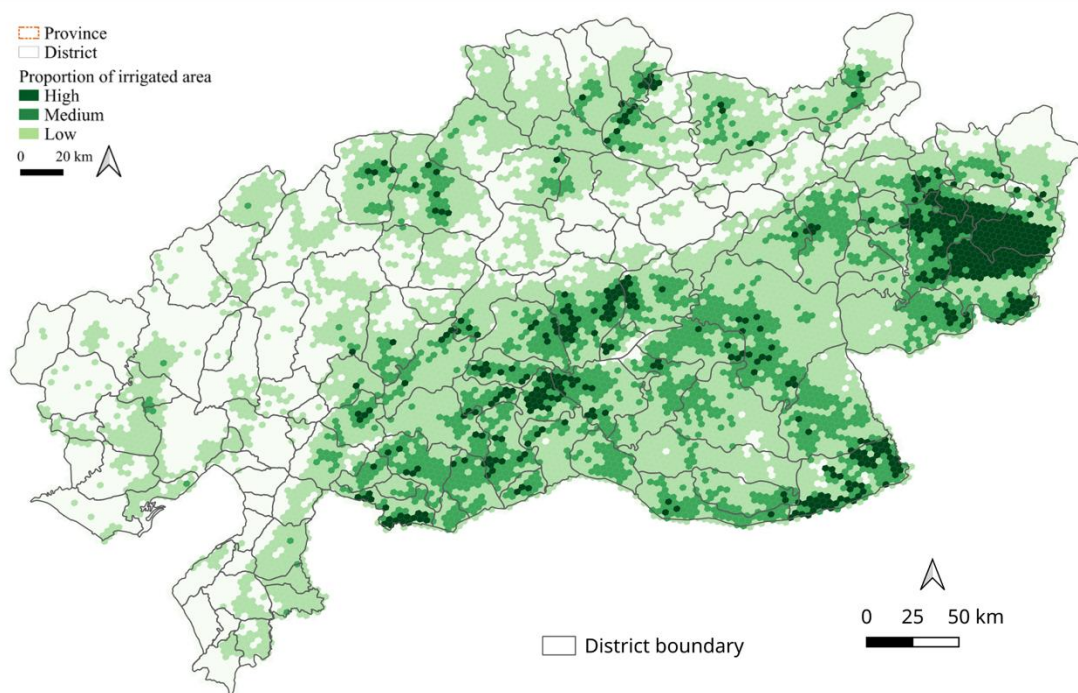


Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 5: Extent of irrigated cropland

This indicator helps identifying areas with a potentially higher degree of dependency on irrigated cropland to estimate the exposure to earthquake damages. For better representation and visualization, Level-3 admin boundaries are further broken down into 10Km<sup>2</sup> hexagon grid. Hexagons have a lower max distance between members and considering spatial autocorrelation, they may be more alike and better representatives of the group. Pixels of irrigated cropland classes are aggregated by hexagon using mean reduction. Each input pixel is converted to a 'hex coordinate' and a unique ID is computed from those.

Figure 6 Extent of Irrigated cropland of affected areas



Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

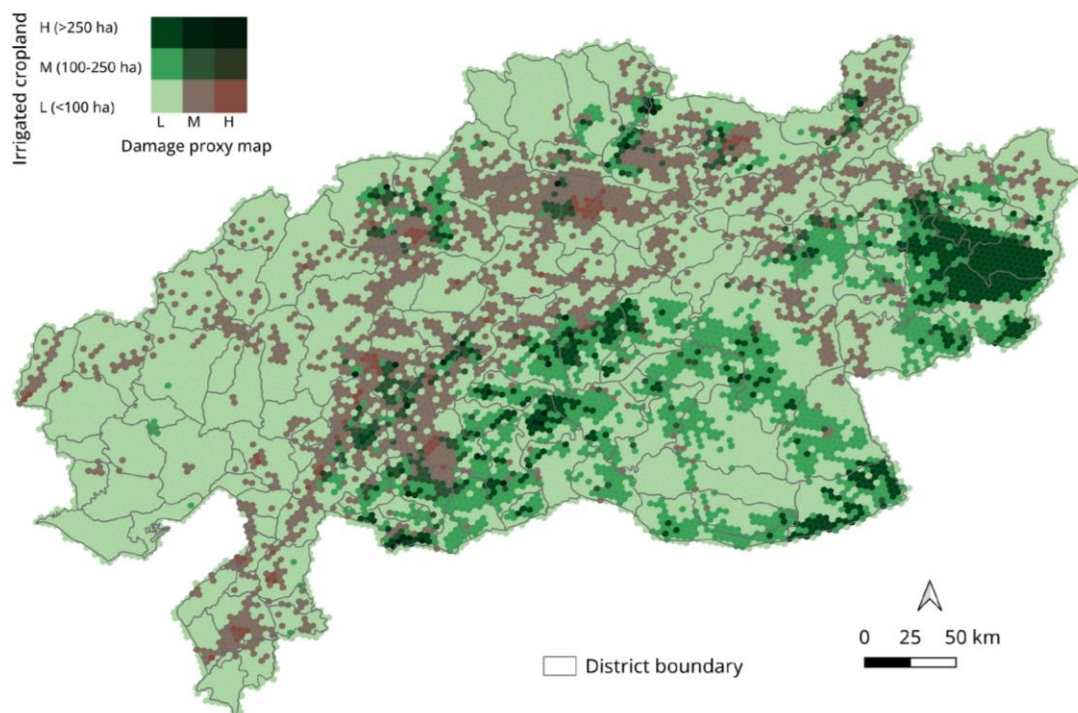


## Result 6: Exposure of irrigated cropland

Proxy indicator of exposure of agricultural sector was prepared by combining land cover, cropland, derived damage proxy map (Earth observatory, Singapore), The proxy indicator helps identifying areas with a potentially higher degree of farmers' exposure to earthquake damages. The final map created using two separate GIS layers, each containing hexagonal grids. The first layer contains information on the irrigated areas, while the second layer contains information on the potentially damaged areas due to an earthquake. To create the map, these two layers are overlaid on top of each other. This means that the hexagonal grids from both layers are combined into a single map. The resulting map will show which irrigated areas are potentially impacted by the earthquake, based on the overlap between the two layers. The table-4 of annex-I provides information on the number of hexagons that combine the extent of irrigated areas and damage classes at the district level. The damage classes include low, medium, and high, while the irrigated cropland classes include low, medium, and high. The table presents data from various districts across different provinces. The number of hexagons varies across the districts, with some having high numbers, while others have low numbers. The names of districts and the agricultural land (in low, medium and high degrees) are included in table-4 of Annex 1.

By analyzing this map, we can identify which irrigated areas are at risk of damage due to the earthquake. This information can be used to develop strategies for disaster preparedness and response, such as identifying areas where emergency resources should be concentrated in the event of an earthquake.

Figure 7 Exposure of irrigated cropland

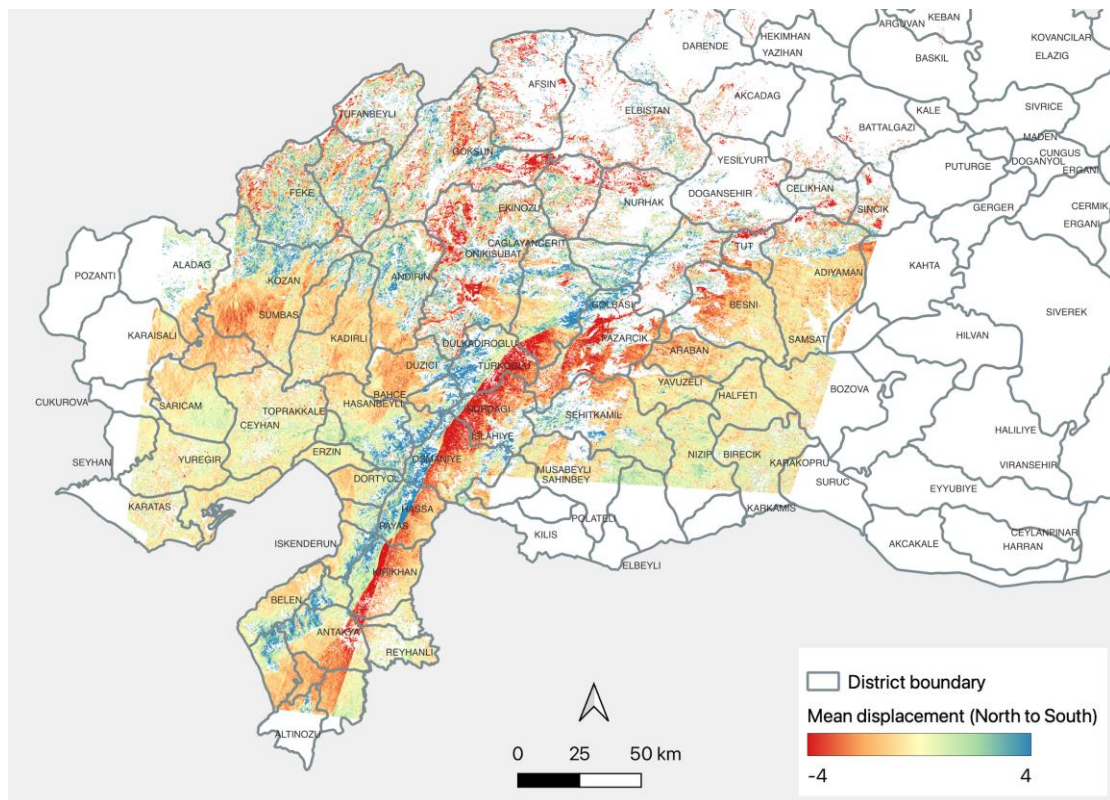


Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 7: Land Deformation

Land deformation map was prepared by using multiple pre and post earthquake sentinel 1 time series images to estimate the horizontal displacement. This indicator helps identifying areas with a potentially impacted aquifer system to earthquake damages. High displacement zones correspond to higher impact on aquifer systems due to compaction and leakage. Table-6 of annex-I shows the district wise mean displacement.

Figure 8 Land deformation map

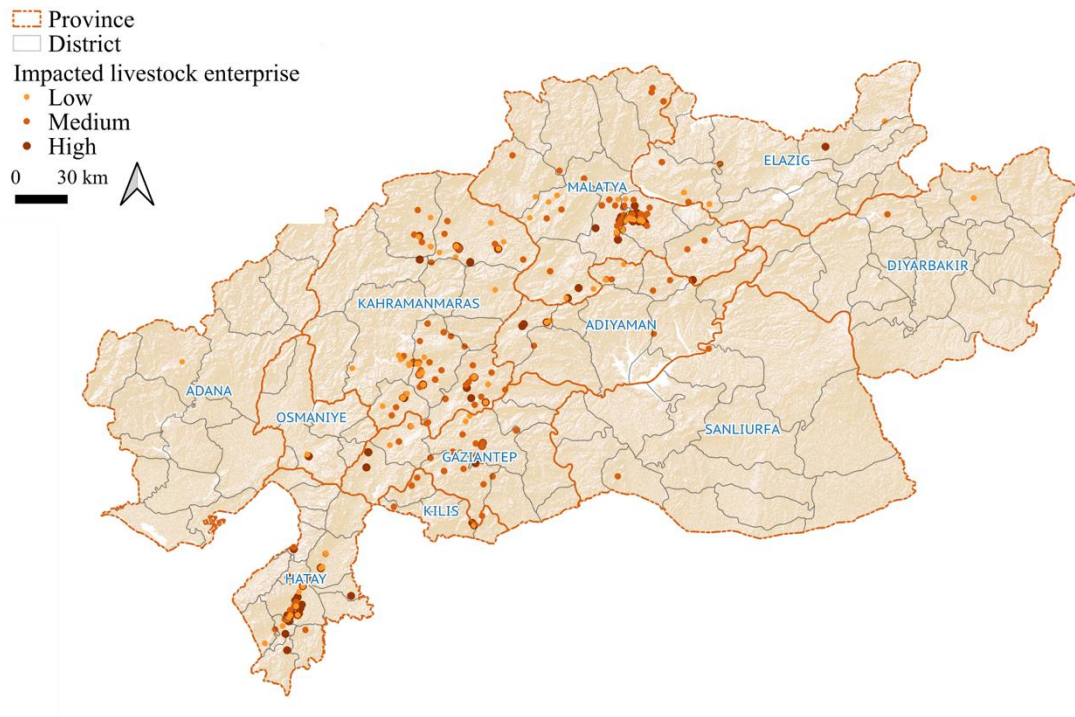


Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

## Result 8: Impact on livestock enterprises

The locations livestock enterprises and damage proxy map were overlaid to stratify locations of irrigation infrastructure based on earthquake damage magnitude. Humanitarian Data Exchange (HDX) boundaries (HDX, 2020) were used to extract the statistics at the sub-district levels.

Figure 9 Map of likely impacted livestock enterprises



Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

# Conclusion and recommendations

This rapid geospatial assessment of impacts from earthquake during February 2023 integrates various sources of information and data adapted to the national and district levels, in support to national and district-level responses. Among the various data and information sources that have been used differently, we can note (1) administrative boundaries at admin 1, admin 2 and admin 3 levels from UNOCHA HDX (2) S1-S2-Planet based land cover map and crop mask with rainfed, irrigated and horticulture crops at various admin levels, (3) Damage proxy map derived from Sentinel-1 (4) population data from worldpop (5) Geolocations of livestock enterprises received from FAO, Country office in Türkiye.

The results are provided in the form of maps and tables by administrative units for the various indicators. With recent advances in geospatial and information technologies, updated land cover, crop specific information adapted to the national conditions with tailored field campaigns have the potential to better support response programs and agricultural development in the future. Indeed, the use of geospatial technologies through field data integration, remote sensing, machine learning and cloud computing holds great potential to provide rapid information for rapid responses to shocks and crises. With the goal of providing accurate and actionable data based on geospatial for immediate and longer-term responses, it would be recommended to strengthen national and regional capacities in collecting, preparing, analyzing and disseminating the results.

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# Annex I – Results at district level

Table 1 Total land area, likely damaged areas at district level

ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
1	ADANA	IMAMOGLU	458.58	0.002	0.010	0.006	0.018
2	ADANA	ALADAG	1340.45	0.616	0.708	0.481	1.805
3	ADANA	CEYHAN	1411.93	0.037	0.203	0.068	0.309
4	ADANA	FEKE	1217.81	0.449	0.774	0.422	1.646
5	ADANA	KARAIKALI	1164.98	0.824	0.246	0.234	1.304
6	ADANA	KARATAS	801.12	0.005	0.019	0.010	0.034
7	ADANA	KOZAN	1903.22	0.567	0.663	0.348	1.579
8	ADANA	POZANTI	898.77	3.192	0.921	0.852	4.966
9	ADANA	SAIMBEYLI	988.77	0.309	0.508	0.320	1.138
10	ADANA	SARICAM	823.13	0.021	0.132	0.039	0.191
11	ADANA	SEYHAN	387.39	0.032	0.122	0.053	0.207
12	ADANA	TUFANBEYLI	851.41	0.150	0.277	0.158	0.584
13	ADANA	CUKUROVA	306.60	0.009	0.051	0.019	0.078
14	ADANA	YUREGIR	816.32	0.013	0.082	0.032	0.127
15	ADANA	YUMURTALIK	456.33	0.005	0.016	0.009	0.030
16	ADIYAMAN	ADIYAMAN	1813.61	0.781	4.149	1.115	6.045
17	ADIYAMAN	BESNI	1234.99	0.607	2.084	0.609	3.300
18	ADIYAMAN	CELIKHAN	443.64	0.220	0.999	0.354	1.573

ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
19	ADIYAMAN	GERGER	667.89	0.080	0.398	0.126	0.605
20	ADIYAMAN	GOLBASI	799.70	1.436	2.506	1.184	5.126
21	ADIYAMAN	KAHTA	1274.07	0.027	0.489	0.069	0.585
22	ADIYAMAN	SINCIK	494.75	0.121	0.899	0.224	1.244
23	ADIYAMAN	SAMSAT	318.92	0.014	0.139	0.019	0.173
24	ADIYAMAN	TUT	289.90	0.204	0.545	0.175	0.923
25	DIYARBAKIR	BISMIL	1678.62	0.009	0.313	0.033	0.355
26	DIYARBAKIR	BAGLAR	462.27	0.073	0.464	0.126	0.664
27	DIYARBAKIR	DICLE	737.54	0.069	0.606	0.189	0.864
28	DIYARBAKIR	EGIL	448.95	0.019	0.270	0.069	0.358
29	DIYARBAKIR	ERGANI	1509.95	0.339	1.409	0.559	2.307
30	DIYARBAKIR	CERMIK	947.96	0.262	1.077	0.380	1.719
31	DIYARBAKIR	HANI	436.32	0.252	0.866	0.383	1.501
32	DIYARBAKIR	HAZRO	415.99	0.015	0.227	0.048	0.290
33	DIYARBAKIR	CINAR	1884.95	0.347	1.174	0.399	1.919
34	DIYARBAKIR	KAYAPINAR	491.58	0.009	0.306	0.055	0.370
35	DIYARBAKIR	KOCAKOY	270.48	0.009	0.170	0.042	0.222
36	DIYARBAKIR	KULP	1412.30	0.259	1.289	0.465	2.013
37	DIYARBAKIR	LICE	982.21	0.165	1.203	0.384	1.752
38	DIYARBAKIR	CUNGUS	512.16	0.306	0.663	0.329	1.298
39	DIYARBAKIR	SILVAN	1252.18	0.074	0.489	0.112	0.675
40	DIYARBAKIR	SUR	1214.38	0.010	0.186	0.039	0.234
41	DIYARBAKIR	YENISEHIR	361.82	0.006	0.218	0.041	0.266

ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
42	ELAZIG	AGIN	241.72	0.037	0.239	0.076	0.352
43	ELAZIG	ALACAKAYA	318.43	0.142	0.356	0.209	0.707
44	ELAZIG	ARICAK	353.63	0.158	0.526	0.261	0.945
45	ELAZIG	BASKIL	1317.40	0.792	2.808	1.148	4.748
46	ELAZIG	ELAZIG	2242.72	2.340	5.911	2.595	10.846
47	ELAZIG	KARAKOCAN	1048.90	0.332	2.011	0.701	3.044
48	ELAZIG	KEBAN	641.04	0.275	0.715	0.320	1.310
49	ELAZIG	KOVANCILAR	960.41	0.161	1.059	0.393	1.613
50	ELAZIG	MADEN	819.26	0.683	1.234	0.663	2.579
51	ELAZIG	PALU	730.31	0.293	0.858	0.390	1.542
52	ELAZIG	SIVRICE	709.79	0.480	1.023	0.462	1.965
53	GAZIANTEP	SAHINBEY	960.34	0.546	4.028	0.940	5.515
54	GAZIANTEP	SEHITKAMIL	1289.73	1.830	8.009	2.423	12.262
55	GAZIANTEP	ISLAHIYE	865.37	2.021	2.062	1.109	5.192
56	GAZIANTEP	ARABAN	591.52	0.008	0.267	0.032	0.308
57	GAZIANTEP	KARKAMIS	298.43	0.009	0.068	0.013	0.090
58	GAZIANTEP	NIZIP	944.20	0.027	0.611	0.089	0.728
59	GAZIANTEP	NURDAGI	697.29	1.329	2.892	1.304	5.525
60	GAZIANTEP	OGUZELI	689.52	0.025	0.431	0.082	0.538
61	GAZIANTEP	YAVUZELI	467.66	0.010	0.209	0.022	0.241
62	HATAY	ISKENDERUN	256.54	2.141	0.949	0.684	3.773
63	HATAY	ALTINOZU	392.05	0.145	0.246	0.134	0.525
64	HATAY	ANTAKYA	703.42	5.283	2.260	1.942	9.485



ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
65	HATAY	ARSUZ	459.47	0.286	0.420	0.251	0.957
66	HATAY	BELEN	183.92	0.422	0.339	0.272	1.032
67	HATAY	DEFNE	154.67	1.518	0.842	0.658	3.018
68	HATAY	DORTYOL	340.43	0.169	0.232	0.132	0.533
69	HATAY	ERZIN	252.11	0.059	0.132	0.080	0.272
70	HATAY	HASSA	519.58	0.668	0.711	0.483	1.862
71	HATAY	KIRIKHAN	714.95	2.607	1.319	1.013	4.939
72	HATAY	KUMLU	192.83	0.110	0.296	0.093	0.498
73	HATAY	PAYAS	155.55	0.105	0.191	0.090	0.385
74	HATAY	REYHANLI	365.94	0.149	0.782	0.175	1.106
75	HATAY	SAMANDAG	378.62	0.713	0.671	0.485	1.869
76	HATAY	YAYLADAGI	445.02	0.042	0.061	0.035	0.137
77	KAHRAMANMARAS	CAGLAYANCERIT	470.00	0.590	1.439	0.557	2.586
78	KAHRAMANMARAS	AFSIN	1501.77	1.794	5.323	1.976	9.093
79	KAHRAMANMARAS	ANDIRIN	1188.54	0.697	0.740	0.490	1.927
80	KAHRAMANMARAS	DULKADIROGLU	1175.66	4.431	8.943	3.531	16.906
81	KAHRAMANMARAS	EKINOZU	656.39	1.103	1.600	0.730	3.434
82	KAHRAMANMARAS	ELBISTAN	2201.32	7.442	9.222	4.631	21.296
83	KAHRAMANMARAS	GOKSUN	1941.92	1.334	1.613	0.970	3.917
84	KAHRAMANMARAS	NURHAK	1027.70	0.371	1.536	0.469	2.375

ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
85	KAHRAMANMARAS	ONIKISUBAT	2442.56	2.181	5.944	2.170	10.296
86	KAHRAMANMARAS	PAZARCIK	1253.45	2.188	4.572	1.810	8.571
87	KAHRAMANMARAS	TURKOKGLU	660.42	1.515	4.272	1.577	7.364
88	KILIS	ELBEYLI	237.52	0.008	0.171	0.023	0.202
89	KILIS	KILIS	609.25	0.140	1.167	0.293	1.600
90	KILIS	MUSABEYLI	346.22	0.047	0.466	0.072	0.585
91	KILIS	POLATELI	217.63	0.006	0.068	0.005	0.079
92	MALATYA	AKCADAG	1117.89	1.004	4.570	1.406	6.980
93	MALATYA	ARAPGIR	987.28	0.199	0.998	0.410	1.607
94	MALATYA	ARGUVAN	1096.40	0.028	0.347	0.092	0.467
95	MALATYA	BATTALGAZI	945.09	5.290	7.898	3.823	17.012
96	MALATYA	DARENDE	1482.51	1.018	3.128	1.074	5.220
97	MALATYA	DOGANSEHIR	1364.33	0.939	3.167	0.963	5.069
98	MALATYA	DOGANYOL	176.63	0.012	0.094	0.028	0.134
99	MALATYA	HEKIMHAN	1514.33	0.036	0.347	0.087	0.470
100	MALATYA	KALE	236.94	0.057	0.508	0.136	0.702
101	MALATYA	KULUNCAK	644.65	0.000	0.000	0.000	0.000
102	MALATYA	PUTURGE	1085.90	0.272	1.383	0.489	2.143
103	MALATYA	YAZIHAN	652.37	0.195	1.156	0.326	1.677
104	MALATYA	YESILYURT	954.54	9.604	12.030	6.197	27.831
105	OSMANIYE	BAHCE	207.54	0.380	0.347	0.225	0.952
106	OSMANIYE	DUZICI	594.21	0.124	0.281	0.137	0.541

ID	Provinces	Districts	Land area (km2)	Damage proxy class (km2)			Total damages (km2)
				High	Low	Medium	
107	OSMANIYE	HASANBEYLI	167.97	0.079	0.077	0.060	0.216
108	OSMANIYE	KADIRLI	1020.79	0.341	0.325	0.183	0.849
109	OSMANIYE	OSMANIYE	859.28	1.836	1.064	0.761	3.661
110	OSMANIYE	SUMBAS	358.48	0.066	0.076	0.042	0.184
111	OSMANIYE	TOPRAKCALE	112.18	0.039	0.086	0.051	0.176
112	SANLIURFA	AKCAKALE	1040.06	0.002	0.035	0.006	0.042
113	SANLIURFA	BIRECIK	912.92	0.019	0.304	0.028	0.350
114	SANLIURFA	BOZOVA	1304.58	0.048	0.412	0.075	0.535
115	SANLIURFA	CEYLANPINAR	1590.47	0.002	0.119	0.013	0.134
116	SANLIURFA	EYYUBIYE	1625.39	0.007	0.340	0.046	0.392
117	SANLIURFA	HILVAN	1111.30	0.022	0.225	0.052	0.299
118	SANLIURFA	HALILIYE	1924.47	0.008	0.439	0.071	0.519
119	SANLIURFA	HALFETI	609.06	0.022	0.209	0.031	0.262
120	SANLIURFA	HARRAN	903.52	0.010	0.242	0.045	0.297
121	SANLIURFA	KARAKOPRU	1246.19	0.024	0.327	0.075	0.427
122	SANLIURFA	SIVEREK	3936.00	0.880	2.237	0.847	3.965
123	SANLIURFA	SURUC	744.30	0.019	0.260	0.024	0.302
124	SANLIURFA	VIRANSEHIR	2297.27	0.071	0.721	0.155	0.947

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

Table 2 Total land area, areas of land cover classes at district level

ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
1	ADANA	IMAMOGLU	6.24	65.41	13.82	60.93	65.29	26.54	47.81	13.46	3.46	115.36	40.93	459.25
2	ADANA	ALADAG	2.98	203.63	42.29	86.74	64.90	28.66	437.67	11.97	14.76	202.83	246.41	1342.85
3	ADANA	CEYHAN	6.31	163.50	41.87	111.48	84.32	37.43	402.56	5.21	3.32	387.43	170.13	1413.55
4	ADANA	FEKE	2.32	202.01	31.99	79.81	53.60	12.99	336.23	3.36	1.57	216.37	278.93	1219.17
5	ADANA	KARAIKALI	0.84	202.53	40.48	84.11	116.42	28.98	203.77	40.64	0.69	319.75	129.18	1167.39
6	ADANA	KARATAS	1.88	88.66	11.65	12.52	145.92	47.51	130.95	89.64	0.39	231.19	42.32	802.64
7	ADANA	KOZAN	12.37	275.21	50.11	165.41	105.68	38.97	518.64	15.61	1.94	397.91	323.70	1905.53
8	ADANA	POZANTI	0.71	165.94	23.80	75.95	71.10	35.44	236.21	1.58	0.91	164.07	125.19	900.90
9	ADANA	SAIMBEYLI	7.40	261.41	43.67	111.34	24.02	4.05	210.13	1.24	4.85	198.78	122.66	989.54
10	ADANA	SARICAM	13.48	122.01	59.53	145.54	95.03	34.92	62.09	48.75	14.74	180.44	47.94	824.47
11	ADANA	SEYHAN	0.91	43.92	9.30	9.68	81.78	18.18	86.53	1.70	1.01	108.01	27.16	388.17
12	ADANA	TUFANBEYLI	17.35	180.18	68.99	242.64	25.64	9.13	48.54	1.87	16.35	212.52	28.74	851.96
13	ADANA	CUKUROVA	1.80	40.86	20.72	25.77	54.84	18.74	21.27	26.92	1.14	80.22	14.95	307.23
14	ADANA	YUREGIR	2.80	134.38	26.33	43.96	114.41	33.51	133.24	5.21	2.07	291.39	30.40	817.69
15	ADANA	YUMURTALIK	5.83	56.92	34.18	38.99	97.43	35.09	50.69	39.02	2.50	86.39	9.88	456.93
16	ADYAMAN	ADYAMAN	256.85	170.68	201.68	338.57	90.80	67.71	27.51	147.66	271.67	231.74	7.49	1812.35
17	ADYAMAN	BESNI	166.13	130.79	238.32	183.55	45.34	18.22	22.27	3.67	208.73	194.74	22.55	1234.30
18	ADYAMAN	CELIKHAN	3.07	57.29	50.85	83.41	90.99	63.48	10.62	11.55	2.95	63.98	5.15	443.33
19	ADYAMAN	GERGER	37.75	97.04	70.82	211.00	34.85	34.78	13.37	32.93	8.21	121.54	5.08	667.36
20	ADYAMAN	GOLBASI	55.43	108.40	107.96	173.25	79.87	34.00	25.95	6.76	37.27	158.81	11.65	799.35
21	ADYAMAN	KAHTA	195.38	45.24	280.01	216.60	105.22	26.79	2.14	141.56	176.13	83.77	0.22	1273.08
22	ADYAMAN	SINCIK	6.89	94.84	31.88	116.22	59.63	41.93	24.99	1.68	4.67	101.40	10.25	494.38
23	ADYAMAN	SAMSAT	28.84	10.79	47.92	21.43	17.52	3.78	0.34	139.97	36.91	11.11	0.08	318.68

ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
24	ADIYAMAN	TUT	17.75	14.13	95.02	59.89	19.07	8.57	4.31	1.03	43.13	24.67	2.18	289.73
25	DIYARBAKIR	BISMIL	459.58	30.66	152.12	235.86	48.77	17.11	119.18	16.26	93.95	431.07	73.73	1678.29
26	DIYARBAKIR	BAGLAR	19.22	12.30	6.95	169.12	26.25	91.10	10.78	0.35	47.84	76.84	1.24	462.00
27	DIYARBAKIR	DICLE	69.72	36.32	48.98	178.23	97.84	23.79	43.25	38.13	53.15	139.97	7.76	737.13
28	DIYARBAKIR	EGIL	66.25	39.67	42.04	115.54	9.48	3.38	3.79	6.26	79.75	81.83	0.72	448.70
29	DIYARBAKIR	ERGANI	176.69	39.09	101.85	617.58	68.70	69.91	45.17	7.62	180.03	199.86	2.41	1508.91
30	DIYARBAKIR	CERMIK	85.67	87.03	67.21	415.95	27.58	24.20	14.26	8.26	57.97	158.04	1.08	947.24
31	DIYARBAKIR	HANI	52.03	24.64	54.77	117.56	84.60	15.47	15.58	0.06	15.22	55.11	1.08	436.13
32	DIYARBAKIR	HAZRO	101.46	40.28	61.32	78.58	7.16	2.93	6.48	0.05	45.96	71.55	0.13	415.89
33	DIYARBAKIR	CINAR	234.24	102.96	52.82	599.91	43.45	119.15	75.98	3.29	215.90	429.00	7.27	1883.97
34	DIYARBAKIR	KAYAPINAR	28.53	21.47	10.24	178.78	20.35	72.47	27.12	7.28	45.93	68.50	10.62	491.28
35	DIYARBAKIR	KOCAKOY	88.37	12.28	42.49	45.97	3.72	2.82	0.79	1.68	40.88	31.36	0.03	270.38
36	DIYARBAKIR	KULP	45.70	219.23	65.79	472.98	158.97	109.30	39.64	7.33	5.79	276.17	11.35	1412.25
37	DIYARBAKIR	LICE	69.65	145.08	65.46	292.36	84.32	40.52	46.31	0.14	7.89	224.33	5.85	981.92
38	DIYARBAKIR	CUNGUS	17.90	18.79	18.51	127.69	119.04	37.02	51.39	5.05	3.77	106.21	6.39	511.76
39	DIYARBAKIR	SILVAN	461.35	78.17	153.46	195.62	31.23	11.65	14.43	21.79	125.31	120.25	38.82	1252.08
40	DIYARBAKIR	SUR	304.82	25.21	106.65	305.09	78.35	30.76	25.81	7.85	128.11	194.46	6.76	1213.87
41	DIYARBAKIR	YENISEHIR	37.68	32.00	10.88	87.01	18.40	11.32	58.04	2.65	15.46	66.48	21.70	361.62
42	ELAZIG	AGIN	33.80	0.00	0.02	16.71	7.43	0.00	16.30	0.00	1.85	0.02	0.20	76.34
43	ELAZIG	ALACAKAYA	29.41	0.00	0.00	11.19	53.93	0.01	192.27	0.02	17.40	0.01	13.99	318.22
44	ELAZIG	ARICAK	31.43	0.00	0.00	2.43	94.89	0.00	187.13	0.00	8.85	0.03	28.64	353.40
45	ELAZIG	BASKIL	474.14	0.00	0.00	121.00	171.93	0.01	376.49	0.38	136.10	0.00	36.34	1316.38
46	ELAZIG	ELAZIG	119.41	0.00	0.00	488.45	204.87	0.00	187.05	0.00	1059.30	0.00	181.86	2240.95
47	ELAZIG	KARAKOCAN	27.74	0.00	0.00	138.19	142.68	0.00	40.28	0.00	331.99	0.00	367.38	1048.25
48	ELAZIG	KEBAN	129.58	0.00	0.00	133.51	26.38	0.02	222.73	0.03	105.23	0.01	23.03	640.52

ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
49	ELAZIG	KOVANCILAR	48.53	0.00	0.00	160.10	120.38	0.00	73.69	0.00	415.43	0.00	141.61	959.74
50	ELAZIG	MADEN	32.42	0.00	0.00	53.17	129.69	0.02	487.02	0.01	46.22	0.06	70.05	818.66
51	ELAZIG	PALU	9.58	0.00	0.00	68.85	54.46	0.00	175.43	0.00	204.50	0.00	217.03	729.86
52	ELAZIG	SIVRICE	34.24	0.00	0.00	69.26	180.00	0.02	358.39	0.18	32.92	0.02	34.21	709.23
53	GAZIANTEP	SAHINBEY	142.86	87.53	156.72	194.13	40.48	20.74	14.03	3.50	149.40	148.88	1.88	960.14
54	GAZIANTEP	SEHITKAMIL	195.13	187.73	183.06	215.37	72.13	39.84	33.93	0.21	148.25	212.28	1.42	1289.36
55	GAZIANTEP	ISLAHIYE	32.52	133.18	27.59	146.95	30.19	40.26	172.68	19.53	42.81	151.37	68.49	865.58
56	GAZIANTEP	ARABAN	72.25	80.15	76.83	132.77	23.63	12.47	5.59	6.16	92.71	88.31	0.36	591.22
57	GAZIANTEP	KARKAMIS	43.76	3.15	50.03	11.14	4.50	0.99	1.16	6.45	149.18	27.37	0.53	298.25
58	GAZIANTEP	NIZIP	166.46	68.87	181.53	98.15	26.21	10.23	6.39	22.81	248.96	113.23	0.90	943.73
59	GAZIANTEP	NURDAGI	61.93	84.85	28.89	160.70	30.07	69.65	87.15	0.86	29.37	125.13	18.76	697.35
60	GAZIANTEP	OGUZELI	82.86	39.82	91.07	54.59	5.32	2.35	1.92	9.56	282.64	116.15	2.96	689.24
61	GAZIANTEP	YAVUZELI	48.89	74.61	59.94	126.75	19.77	11.99	2.24	2.36	68.19	52.65	0.06	467.45
62	HATAY	ISKENDERUN	0.26	22.15	4.06	11.19	25.89	9.83	47.94	3.67	0.48	36.53	94.71	256.71
63	HATAY	ALTINOZU	2.40	92.74	101.43	64.06	12.88	4.75	25.17	2.25	12.96	71.60	2.06	392.31
64	HATAY	ANTAKYA	2.73	116.93	53.57	42.01	70.78	35.46	130.65	2.01	4.27	165.58	79.96	703.96
65	HATAY	ARSUZ	1.22	54.95	10.74	21.98	76.55	13.07	96.38	8.13	0.29	87.68	88.94	459.92
66	HATAY	BELEN	0.86	22.72	6.31	14.89	11.44	3.79	49.17	0.08	0.77	31.10	42.93	184.06
67	HATAY	DEFNE	0.25	29.36	9.07	7.74	8.27	2.56	45.28	0.10	0.94	45.97	5.27	154.80
68	HATAY	DORTYOL	0.03	17.12	0.88	3.27	17.77	2.73	62.00	0.26	0.12	48.64	187.82	340.64
69	HATAY	ERZIN	0.43	28.64	1.25	11.97	27.69	16.41	53.93	0.88	0.06	78.56	32.49	252.31
70	HATAY	HASSA	7.36	89.68	7.64	67.82	10.83	11.10	136.05	0.57	7.04	115.36	66.33	519.79
71	HATAY	KIRIKHAN	23.82	77.40	23.12	100.11	46.41	33.43	129.74	0.45	21.00	211.86	47.99	715.32
72	HATAY	KUMLU	11.07	11.68	12.39	22.08	10.15	10.21	24.46	15.74	4.71	63.67	6.76	192.92
73	HATAY	PAYAS	0.01	3.79	0.20	0.98	8.22	6.06	23.56	0.67	0.02	12.75	99.41	155.65

ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
74	HATAY	REYHANLI	19.83	46.98	23.07	47.05	13.41	13.21	55.01	0.42	18.32	108.79	19.99	366.07
75	HATAY	SAMANDAG	0.15	37.73	27.19	3.51	51.94	2.32	109.23	2.94	1.49	86.09	56.40	378.98
76	HATAY	YAYLADAGI	2.76	77.36	48.72	43.02	9.66	3.06	115.81	1.17	7.85	100.71	35.24	445.36
77	KAHRAMANMARAS	CAGLAYANCERIT	15.66	68.33	67.73	120.34	53.84	35.63	11.68	1.06	14.42	74.94	6.26	469.89
78	KAHRAMANMARAS	AFSIN	148.64	94.97	303.82	329.62	90.60	41.47	34.30	0.22	134.66	299.41	24.14	1501.84
79	KAHRAMANMARAS	ANDIRIN	1.00	160.94	36.58	63.06	30.61	7.10	269.25	12.77	0.50	264.00	343.35	1189.16
80	KAHRAMANMARAS	DULKADIROGLU	58.70	145.50	140.05	223.69	111.82	83.47	143.41	7.84	34.33	190.64	36.12	1175.56
81	KAHRAMANMARAS	EKINOZU	12.92	101.72	30.51	175.20	80.87	54.92	38.36	13.04	14.42	115.71	18.63	656.31
82	KAHRAMANMARAS	ELBISTAN	313.56	120.43	489.41	556.18	109.73	46.58	40.72	0.92	190.70	308.79	23.69	2200.73
83	KAHRAMANMARAS	GOKSUN	16.90	365.23	150.84	385.29	127.21	70.89	197.19	16.79	17.16	468.42	126.64	1942.58
84	KAHRAMANMARAS	NURHAK	39.36	113.27	145.37	325.83	133.87	61.42	11.23	0.15	31.46	158.79	6.61	1027.37
85	KAHRAMANMARAS	ONIKISUBAT	34.66	384.78	153.53	349.77	243.09	108.86	379.50	77.47	17.03	424.79	269.56	2443.05
86	KAHRAMANMARAS	PAZARCIK	101.61	206.45	96.16	315.41	52.91	57.08	68.95	8.11	80.30	216.31	49.84	1253.14
87	KAHRAMANMARAS	TURKOGLU	32.88	106.00	26.76	121.29	34.00	41.29	72.32	1.09	14.48	153.51	56.86	660.50
88	KILIS	ELBEYLI	16.91	11.53	15.56	39.98	2.36	0.44	0.69	0.00	96.25	50.59	3.12	237.44
89	KILIS	KILIS	46.87	105.40	57.49	175.66	24.32	14.84	16.33	1.69	85.09	79.06	2.39	609.17
90	KILIS	MUSABEYLI	16.85	77.83	29.01	119.98	10.13	10.83	14.95	0.84	13.33	51.63	0.85	346.23
91	KILIS	POLATELI	17.50	15.20	30.03	87.07	5.83	4.51	2.68	0.02	29.39	24.96	0.41	217.61
92	MALATYA	AKCADAG	47.59	143.64	265.99	320.16	62.19	24.85	10.92	2.84	48.35	186.79	3.95	1117.27
93	MALATYA	ARAPGIR	76.22	137.75	105.10	339.17	70.37	31.56	26.09	3.36	41.18	149.21	6.52	986.54

ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
94	MALATYA	ARGUVAN	56.64	122.91	136.40	296.13	170.20	68.16	15.84	23.34	62.42	137.24	6.35	1095.62
95	MALATYA	BATTALGAZI	15.05	118.42	47.95	191.23	168.18	116.06	47.00	16.63	11.05	205.83	7.00	944.38
96	MALATYA	DARENDE	166.13	69.88	449.35	317.78	139.28	75.73	12.08	0.25	103.94	142.82	4.64	1481.88
97	MALATYA	DOGANSEHIR	28.50	197.62	148.95	380.85	165.60	114.67	20.95	5.06	17.06	268.78	15.52	1363.57
98	MALATYA	DOGANYOL	0.29	4.34	0.37	30.26	39.96	3.69	35.54	8.00	0.22	49.92	3.90	176.49
99	MALATYA	HEKIMHAN	42.97	264.20	205.07	537.74	85.10	67.68	23.08	1.83	49.86	225.91	9.99	1513.44
100	MALATYA	KALE	0.61	0.09	1.65	34.61	57.99	21.09	33.62	18.54	0.32	66.11	2.13	236.75
101	MALATYA	KULUNCAK	35.59	67.33	81.66	232.81	45.37	31.21	8.66	0.84	25.94	108.48	6.46	644.35
102	MALATYA	PUTURGE	3.47	234.34	32.83	277.77	107.16	41.40	70.39	5.74	1.57	271.63	38.74	1085.04
103	MALATYA	YAZIHAN	51.39	27.58	156.51	105.76	75.04	17.70	9.58	32.49	76.41	99.15	0.33	651.94
104	MALATYA	YESILYURT	39.28	103.36	113.73	283.19	132.18	49.91	14.63	1.94	32.30	179.88	3.50	953.89
105	OSMANIYE	BAHCE	0.48	31.09	1.14	14.49	7.77	3.28	45.78	0.16	0.28	44.02	59.13	207.61
106	OSMANIYE	DUZICI	0.58	85.17	3.63	45.59	16.12	10.32	119.44	21.23	0.51	111.35	180.55	594.49
107	OSMANIYE	HASANBEYLI	0.62	23.24	0.73	11.15	1.88	0.88	38.51	0.93	0.15	19.49	70.46	168.03
108	OSMANIYE	KADIRLI	0.56	131.53	50.06	46.09	28.77	7.68	369.42	8.93	1.07	240.77	136.74	1021.62
109	OSMANIYE	OSMANIYE	1.89	98.06	15.43	52.18	46.14	12.80	198.26	3.02	0.93	122.72	308.38	859.82
110	OSMANIYE	SUMBAS	0.20	48.05	15.26	17.56	3.18	0.37	127.81	2.87	0.82	94.13	48.52	358.79
111	OSMANIYE	TOPRAKKALE	1.76	12.89	1.04	11.67	15.16	12.05	24.49	0.57	0.13	25.54	6.98	112.27
112	SANLIURFA	AKCAKALE	98.24	48.15	118.94	116.29	15.22	2.11	9.99	0.08	231.56	398.59	0.05	1039.23
113	SANLIURFA	BIRECIK	101.18	26.53	181.59	41.61	20.85	6.59	0.74	24.77	463.83	43.55	1.09	912.34
114	SANLIURFA	BOZOVA	168.53	112.06	123.84	68.47	18.35	6.16	20.72	60.49	531.00	191.04	3.00	1303.65
115	SANLIURFA	CEYLANPINAR	295.49	79.68	143.79	126.05	17.13	5.93	16.26	0.34	646.77	257.59	0.40	1589.43
116	SANLIURFA	EYYUBIYE	80.76	37.13	161.04	73.37	33.75	3.48	22.09	1.02	823.21	388.12	0.17	1624.12
117	SANLIURFA	HILVAN	139.78	67.50	67.78	203.71	11.60	9.28	15.49	78.65	370.10	144.57	1.95	1110.42



ID	Provinces	Districts	Land cover classes (km2)											
			Bare soil	Grassland	Irrigated cropland	Orchard cropland	Rainfed cropland	Tree cover	Built-up	water body	Shrubland	Road	Green house	Total
118	SANLIURFA	HALILIYE	184.44	60.59	157.50	146.02	29.82	7.54	21.76	2.48	902.03	410.27	0.48	1922.95
119	SANLIURFA	HALFETI	94.84	117.67	56.37	36.55	19.88	3.75	0.70	10.61	225.51	42.61	0.20	608.69
120	SANLIURFA	HARRAN	59.20	43.83	68.07	91.02	4.07	0.68	5.06	0.47	270.40	359.99	0.02	902.81
121	SANLIURFA	KARAKOPRU	171.00	30.25	197.29	138.54	46.85	26.24	3.28	92.57	429.81	109.27	0.09	1245.21
122	SANLIURFA	SIVEREK	238.51	217.26	94.78	1722.94	81.21	302.85	104.45	70.10	595.33	486.15	19.42	3933.00
123	SANLIURFA	SURUC	50.69	34.93	88.34	108.34	11.24	3.85	3.75	0.34	183.02	259.15	0.12	743.76
124	SANLIURFA	VIRANSEHIR	118.69	106.02	58.34	687.06	49.99	198.12	126.26	2.43	506.93	408.15	33.70	2295.69

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

Table 3 Total population and number of people affected at district level

ID	Provinces	District	Total population	Population affected
1	ADANA	IMAMOGLU	25193	26
2	ADANA	ALADAG	10458	614
3	ADANA	CEYHAN	140989	757
4	ADANA	FEKE	14864	862
5	ADANA	KARAIHALI	19498	852
6	ADANA	KARATAS	105443	498
7	ADANA	KOZAN	107757	1669
8	ADANA	POZANTI	29136	8404
9	ADANA	SAIMBEYLI	15285	848
10	ADANA	SARICAM	70062	168
11	ADANA	SEYHAN	524916	1544
12	ADANA	TUFANBEYLI	13268	556
13	ADANA	CUKUROVA	331509	474
14	ADANA	YUREGIR	95965	135
15	ADANA	YUMURTALIK	311636	442
16	ADIYAMAN	ADIYAMAN	281012	23622
17	ADIYAMAN	BESNI	75310	8203
18	ADIYAMAN	CELIKHAN	8645	2321
19	ADIYAMAN	GERGER	19986	978
20	ADIYAMAN	GOLBASI	39307	11152
21	ADIYAMAN	KAHTA	116105	2880
22	ADIYAMAN	SINCIK	17903	1898
23	ADIYAMAN	SAMSAT	10147	449
24	ADIYAMAN	TUT	4507	865

ID	Provinces	District	Total population	Population affected
25	DIYARBAKIR	BISMIL	92167	787
26	DIYARBAKIR	BAGLAR	195274	2834
27	DIYARBAKIR	DICLE	40409	1655
28	DIYARBAKIR	EGIL	38875	611
29	DIYARBAKIR	ERGANI	156088	6984
30	DIYARBAKIR	CERMIK	53723	3584
31	DIYARBAKIR	HANI	29678	3264
32	DIYARBAKIR	HAZRO	20818	556
33	DIYARBAKIR	CINAR	86899	2504
34	DIYARBAKIR	KAYAPINAR	313214	2909
35	DIYARBAKIR	KOCAKOY	28149	513
36	DIYARBAKIR	KULP	41074	2909
37	DIYARBAKIR	LICE	28621	2697
38	DIYARBAKIR	CUNGUS	13176	2266
39	DIYARBAKIR	SILVAN	62457	1420
40	DIYARBAKIR	SUR	169767	957
41	DIYARBAKIR	YENISEHIR	328583	2719
42	ELAZIG	AGIN	1852	124
43	ELAZIG	ALACAKAYA	9698	1665
44	ELAZIG	ARICAK	11622	2071
45	ELAZIG	BASKIL	12844	1620
46	ELAZIG	ELAZIG	447329	37102
47	ELAZIG	KARAKOCAN	16046	1883
48	ELAZIG	KEBAN	6128	826
49	ELAZIG	KOVANCILAR	29503	1852
50	ELAZIG	MADEN	11469	1867

ID	Provinces	District	Total population	Population affected
51	ELAZIG	PALU	19193	2561
52	ELAZIG	SIVRICE	7873	1229
53	GAZIANTEP	SAHINBEY	1173753	68169
54	GAZIANTEP	SEHITKAMIL	813400	71791
55	GAZIANTEP	ISLAHIYE	49200	8630
56	GAZIANTEP	ARABAN	33605	773
57	GAZIANTEP	KARKAMIS	24073	151
58	GAZIANTEP	NIZIP	149482	1957
59	GAZIANTEP	NURDAGI	28280	6496
60	GAZIANTEP	OGUZELI	73151	1246
61	GAZIANTEP	YAVUZELI	21101	371
62	HATAY	ISKENDERUN	202845	17656
63	HATAY	ALTINOZU	61025	1772
64	HATAY	ANTAKYA	425652	59249
65	HATAY	ARSUZ	205341	5096
66	HATAY	BELEN	51459	4299
67	HATAY	DEFNE	191549	17554
68	HATAY	DORTYOL	101084	1849
69	HATAY	ERZIN	32319	519
70	HATAY	HASSA	55049	4567
71	HATAY	KIRIKHAN	93610	13418
72	HATAY	KUMLU	9109	529
73	HATAY	PAYAS	52335	1181
74	HATAY	REYHANLI	93219	3384
75	HATAY	SAMANDAG	172166	9909
76	HATAY	YAYLADAGI	48165	622

ID	Provinces	District	Total population	Population affected
77	KAHRAMANMARAS	CAGLAYANCERIT	24658	4944
78	KAHRAMANMARAS	AFSIN	82027	17902
79	KAHRAMANMARAS	ANDIRIN	41577	2405
80	KAHRAMANMARAS	DULKADIROGLU	272454	67899
81	KAHRAMANMARAS	EKINOZU	12173	3302
82	KAHRAMANMARAS	ELBISTAN	141031	51240
83	KAHRAMANMARAS	GOKSUN	41467	5131
84	KAHRAMANMARAS	NURHAK	7914	1811
85	KAHRAMANMARAS	ONIKISUBAT	354813	39569
86	KAHRAMANMARAS	PAZARCIK	98449	18520
87	KAHRAMANMARAS	TURKOGLU	101147	18568
88	KILIS	ELBEYLI	7465	183
89	KILIS	KILIS	97870	4566
90	KILIS	MUSABEYLI	14466	870
91	KILIS	POLATELI	4249	85
92	MALATYA	AKCADAG	21170	3032
93	MALATYA	ARAPGIR	7862	803
94	MALATYA	ARGUVAN	6165	257
95	MALATYA	BATTALGAZI	215018	71546
96	MALATYA	DARENDE	21889	3650
97	MALATYA	DOGANSEHIR	30562	6150

ID	Provinces	District	Total population	Population affected
98	MALATYA	DOGANYOL	1989	45
99	MALATYA	HEKIMHAN	10784	230
100	MALATYA	KALE	7640	416
101	MALATYA	KULUNCAK	5985	0
102	MALATYA	PUTURGE	24331	3022
103	MALATYA	YAZIHAN	12294	1122
104	MALATYA	YESILYURT	335015	105616
105	OSMANIYE	BAHCE	16961	1363
106	OSMANIYE	DUZICI	74770	1102
107	OSMANIYE	HASANBEYLI	5475	288
108	OSMANIYE	KADIRLI	127854	1979
109	OSMANIYE	OSMANIYE	273257	20502
110	OSMANIYE	SUMBAS	12316	147
111	OSMANIYE	TOPRAKKALE	25807	251
112	SANLIURFA	AKCAKALE	143751	39
113	SANLIURFA	BIRECIK	98069	829
114	SANLIURFA	BOZOVA	47594	647
115	SANLIURFA	CEYLANPINAR	57041	196
116	SANLIURFA	EYYUBIYE	421646	1857
117	SANLIURFA	HILVAN	34975	712
118	SANLIURFA	HALILIYE	378963	2655
119	SANLIURFA	HALFETI	40801	421
120	SANLIURFA	HARRAN	89515	961
121	SANLIURFA	KARAKOPRU	214592	1452
122	SANLIURFA	SIVEREK	200543	7905
123	SANLIURFA	SURUC	143380	1039

ID	Provinces	District	Total population	Population affected
124	SANLIURFA	VIRANSEHIR	145445	1659

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

Table 4 Number of hexagons combining extent of irrigated areas and damage classes at district level

ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
1	ADANA	ALADAG	103			22				
2	ADANA	CEYHAN	127	2		3				
3	ADANA	CUKUROVA	28			1				
4	ADANA	FEKE	90			24				
5	ADANA	IMAMOGLU	39	3						
6	ADANA	KARASALI	105			3			1	
7	ADANA	KARATAS	73							
8	ADANA	KOZAN	162	2		14				
9	ADANA	POZANTI	60			20			2	
10	ADANA	SAIMBEYLI	77			14				
11	ADANA	SARICAM	77			3				
12	ADANA	SEYHAN	31			4				
13	ADANA	TUFANBEYLI	70	1		11				
14	ADANA	YUMURTALIK	45	1						
15	ADANA	YUREGIR	74							
16	ADIYAMAN	ADIYAMAN	53	38	27	34	12	2	1	
17	ADIYAMAN	BESNI	42	38	6	22	5	1	1	
18	ADIYAMAN	CELIKHAN	28			9			1	
19	ADIYAMAN	GERGER	57			4				
20	ADIYAMAN	GOLBASI	34	2	3	29	6	1	1	
21	ADIYAMAN	KAHTA	67	40	11	3	4			
22	ADIYAMAN	SAMSAT	18	7	3	1	1			



ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
23	ADIYAMAN	SINCIK	32			15				
24	ADIYAMAN	TUT	17	1		10				
25	DIYARBAKIR	BAGLAR	32	6		6				
26	DIYARBAKIR	BISMIL	42	36	79	3				
27	DIYARBAKIR	CERMIK	42	16	2	25	4			
28	DIYARBAKIR	CINAR	90	52	11	22	1			
29	DIYARBAKIR	CUNGUS	33			16	1			
30	DIYARBAKIR	DICLE	41	11	5	6	5			
31	DIYARBAKIR	EGIL	22	13	3	4	1			
32	DIYARBAKIR	ERGANI	67	49	3	10	10		1	
33	DIYARBAKIR	HANI	15	5	6	10	6			
34	DIYARBAKIR	HAZRO	17	4	16	3				
35	DIYARBAKIR	KAYAPINAR	29	10		4	1			
36	DIYARBAKIR	KOCAKOY	4	4	14		3			
37	DIYARBAKIR	KULP	100	5	1	27				
38	DIYARBAKIR	LICE	56	16	3	13	2			
39	DIYARBAKIR	SILVAN	26	9	71	5	3			
40	DIYARBAKIR	SUR	7	50	54	1	1			
41	DIYARBAKIR	YENISEHIR	18	12	1	2	1			
42	ELAZIG	AGIN	12	2	1	6	1			
43	ELAZIG	ALACAKAYA	16			13				
44	ELAZIG	ARICAK	20			15				
45	ELAZIG	BASKIL	44	13	8	49	9	1		
46	ELAZIG	ELAZIG	114	15	3	57	12		6	

ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
47	ELAZIG	KARAKOCAN	54	4	1	34	5	1		
48	ELAZIG	KEBAN	38	2	1	18	1	3		
49	ELAZIG	KOVANCILAR	61	5	1	16	7			
50	ELAZIG	MADEN	50			27				
51	ELAZIG	PALU	44	2		20				
52	ELAZIG	SIVRICE	41			25				
53	GAZIANTEP	ARABAN	22	20	8	2	1	1		
54	GAZIANTEP	ISLAHIYE	41	10		22	4		3	1
55	GAZIANTEP	KARKAMIS	12	12	3					
56	GAZIANTEP	NIZIP	31	42	10	3	2	1		
57	GAZIANTEP	NURDAGI	18	4	4	25	15		1	
58	GAZIANTEP	OGUZELI	21	37	2	2	2			
59	GAZIANTEP	SAHINBEY	20	25	4	16	27	1	1	
60	GAZIANTEP	SEHITKAMIL	31	18	3	49	11	1	6	
61	GAZIANTEP	YAVUZELI	22	15	7		2			
62	HATAY	ALTINOZU	31			7				
63	HATAY	ANTAKYA	32			27			5	
64	HATAY	ARSUZ	36			6				
65	HATAY	BELEN	11			6				
66	HATAY	DEFNE	4			9			1	
67	HATAY	DORTYOL	25			5				
68	HATAY	ERZIN	20			2				
69	HATAY	HASSA	29			19				
70	HATAY	ISKENDERUN	13			10			2	

ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
71	HATAY	KIRIKHAN	48	2		13			4	
72	HATAY	KUMLU	11			6				
73	HATAY	PAYAS	12			3				
74	HATAY	REYHANLI	27	1		9				
75	HATAY	SAMANDAG	28			8			1	
76	HATAY	YAYLADAGI	39			1				
77	KAHRAMANMARAS	AFSIN	88	12	3	26	9	1	1	1
78	KAHRAMANMARAS	ANDIRIN	88			22				
79	KAHRAMANMARAS	CAGLAYANCERIT	29			16	1			
80	KAHRAMANMARAS	DULKADIROGLU	34	2		47	18	1	5	
81	KAHRAMANMARAS	EKINOZU	27			32	1		1	
82	KAHRAMANMARAS	ELBISTAN	86	21	7	70	15		7	1
83	KAHRAMANMARAS	GOKSUN	151			30			1	
84	KAHRAMANMARAS	NURHAK	80			13			1	
85	KAHRAMANMARAS	ONIKISUBAT	160	3		60	1	1	4	
86	KAHRAMANMARAS	PAZARCIK	38	8	2	52	16	2	1	2
87	KAHRAMANMARAS	TURKOGLU	19	3	1	31	3		4	
88	KILIS	ELBEYLI	8	12						
89	KILIS	KILIS	13	12	13	9	2	5		

ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
90	KILIS	MUSABEYLI	13	10	1	5	3			
91	KILIS	POLATELI	15	6		1				
92	MALATYA	AKCADAG	27	1		67	10	1		
93	MALATYA	ARAPGIR	66	7		17		2		
94	MALATYA	ARGUVAN	85	12	1	4	1			
95	MALATYA	BATTALGAZI	41			41			7	
96	MALATYA	DARENDE	75	9		56	1			
97	MALATYA	DOGANSEHIR	83			42			2	
98	MALATYA	DOGANYOL	16			2				
99	MALATYA	HEKIMHAN	135			8				
100	MALATYA	KALE	11			12				
101	MALATYA	KULUNCAK	60							
102	MALATYA	PUTURGE	69			30				
103	MALATYA	YAZIHAN	32	4		21	4			
104	MALATYA	YESILYURT	32			42	5		10	1
105	OSMANIYE	BAHCE	14			5				
106	OSMANIYE	DUZICI	49			7				
107	OSMANIYE	HASANBEYLI	11			4				
108	OSMANIYE	KADIRLI	89			9				
109	OSMANIYE	OSMANIYE	70			11			2	
110	OSMANIYE	SUMBAS	30			2				
111	OSMANIYE	TOPRAKKALE	9			1				
112	SANLIURFA	AKCAKALE	40	54	4					
113	SANLIURFA	BIRECIK	65	17	4	2	1			

ID	Damage class		Low	Low	Low	Medium	Medium	Medium	High	High
	Irrigated cropland class		Low	Medium	High	Low	Medium	High	Low	Medium
	Provinces	District	Number of hexagons							
114	SANLIURFA	BOZOVA	50	53	17	4	1			
115	SANLIURFA	CEYLANPINAR	54	39	54		1			
116	SANLIURFA	EYYUBIYE	142	10		1				
117	SANLIURFA	HALFETI	21	14	16			3		
118	SANLIURFA	HALILIYE	131	44		3				
119	SANLIURFA	HARRAN	46	32	3	2				
120	SANLIURFA	HILVAN	43	52	5		3			
121	SANLIURFA	KARAKOPRU	70	41	3	1	4			
122	SANLIURFA	SIVEREK	185	123	14	42	4			
123	SANLIURFA	SURUC	35	31		1	2			
124	SANLIURFA	VIRANSEHIR	122	85	5	6	1			

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

Table 5 Number of livestock enterprises and respective damage classes at district level

District/ damage class	High	District	Medium	District	LOW
AFSIN	2	AFSIN	24	AFSIN	267
ANTAKYA	161	AKCADAG	2	AKCADAG	30
BATTALGAZI	305	ALTINOZU	1	ALADAG	1
BELEN	60	ANTAKYA	5	ANTAKYA	9
DEFNE	7	ARAPGIR	46	BASKIL	57
DOGANSEHIR	469	BASKIL	64	BATTALGAZI	12
DULKADIROGLU	6	BATTALGAZI	289	CELIKHAN	3
ELBISTAN	25	BELEN	1	DARENDE	2
GOKSUN	360	BESNI	1	DEFNE	2
GOLBASI	522	CELIKHAN	2	DOGANSEHIR	568
ISKENDERUN	3	DARENDE	1	DULKADIROGLU	85
ISLAHIYE	573	DEFNE	1	ELBISTAN	9
KILIS	4	DICLE	1	GOLBASI	2
KIRIKHAN	12	DOGANSEHIR	4	KARAKOCAN	22
KOVANCILAR	1	DULKADIROGLU	478	KILIS	3
KUMLU	1	ELBEYLI	1	KIRIKHAN	679
OSMANIYE	18	ELBISTAN	31	LICE	123
PAZARCIK	29	HEKIMHAN	1	NURDAGI	150
PUTURGE	29	HILVAN	1	NURHAK	1
SAHINBEY	1	ISKENDERUN	2	ONIKSUBAT	323
SEHITKAMIL	2	KAHTA	1	OSMANIYE	150
TURKOGLU	2	KILIS	1	PAZARCIK	81
YAYLADAGI	1	KIRIKHAN	1	SAMANDAG	350
YESILYURT	566	MUSABEYLI	5	SEHITKAMIL	2

District/ damage class	High	District	Medium	District	LOW
		NURDAGI	94	TURKOGLU	210
		OGUZELI	1	YESILYURT	128
		ONIKISUBAT	1208		
		PAZARCIK	951		
		PUTURGE	2		
		SAHINBEY	51		
		SAMANDAG	1		
		SEHITKAMIL	34		
		SINCIK	2		
		SURUC	1		
		TURKOGLU	4		
		YAZIHAN	1		
		YESILYURT	539		

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

Table 6 Mean displacement at district level

ID	District	Provinces	Mean displacement (cm)
104	ALADAG	ADANA	0.44073813
289	CEYHAN	ADANA	0.06646098
901	CUKUROVA	ADANA	-0.0044692
406	FEKE	ADANA	0.39015277
35	IMAMOGLU	ADANA	-0.5755271
543	KARASALI	ADANA	-0.2653689
561	KARATAS	ADANA	0.02993337
623	KOZAN	ADANA	-0.0818613
762	POZANTI	ADANA	
784	SAIMBEYLI	ADANA	0.15703509
799	SARICAM	ADANA	0.06539003
828	SEYHAN	ADANA	0.11793285
888	TUFANBEYLI	ADANA	0.09039266
958	YUMURTALIK	ADANA	0.03880683
957	YUREGIR	ADANA	0.05888066
72	ADYAMAN	ADYAMAN	-0.147572
243	BESNI	ADYAMAN	-0.338942
359	CELIKHAN	ADYAMAN	-0.0571855
426	GERGER	ADYAMAN	
437	GOLBASI	ADYAMAN	0.45415689
595	KAHTA	ADYAMAN	-0.7370286
789	SAMSAT	ADYAMAN	-0.4088593
776	SINCIK	ADYAMAN	-0.3465311
892	TUT	ADYAMAN	-0.7378308
206	BAGLAR	DIYARBAKIR	



ID	District	Provinces	Mean displacement (cm)
200	BISMIL	DIYARBAKIR	
387	CERMIK	DIYARBAKIR	
517	CINAR	DIYARBAKIR	
706	CUNGUS	DIYARBAKIR	
292	DICLE	DIYARBAKIR	
346	EGIL	DIYARBAKIR	
383	ERGANI	DIYARBAKIR	
487	HANI	DIYARBAKIR	
502	HAZRO	DIYARBAKIR	
575	KAYAPINAR	DIYARBAKIR	
611	KOCAKOY	DIYARBAKIR	
636	KULP	DIYARBAKIR	
647	LICE	DIYARBAKIR	
773	SILVAN	DIYARBAKIR	
852	SUR	DIYARBAKIR	
941	YENISEHIR	DIYARBAKIR	
59	AGIN	ELAZIG	-0.2771572
103	ALACAKAYA	ELAZIG	
153	ARICAK	ELAZIG	
225	BASKIL	ELAZIG	-2.4730651
360	ELAZIG	ELAZIG	
551	KARAKOCAN	ELAZIG	
583	KEBAN	ELAZIG	-0.4624035
620	KOVANCILAR	ELAZIG	
657	MADEN	ELAZIG	
738	PALU	ELAZIG	
782	SIVRICE	ELAZIG	
143	ARABAN	GAZIANTEP	-0.3171671

ID	District	Provinces	Mean displacement (cm)
49	ISLAHIYE	GAZIANTEP	0.11902207
566	KARKAMIS	GAZIANTEP	
699	NIZIP	GAZIANTEP	0.2876071
708	NURDAGI	GAZIANTEP	-0.6901182
712	OGUZELI	GAZIANTEP	0.6410888
7	SAHINBEY	GAZIANTEP	0.09046237
17	SEHITKAMIL	GAZIANTEP	0.29006169
929	YAVUZELI	GAZIANTEP	-0.0421255
118	ALTINOZU	HATAY	-0.1983786
138	ANTAKYA	HATAY	-0.0876681
158	ARSUZ	HATAY	0.21143107
241	BELEN	HATAY	0.86781144
310	DEFNE	HATAY	-0.7608664
338	DORTYOL	HATAY	0.19915233
390	ERZIN	HATAY	0.19802327
495	HASSA	HATAY	0.22215119
48	ISKENDERUN	HATAY	0.6464574
600	KIRIKHAN	HATAY	-0.4324835
639	KUMLU	HATAY	-0.2167176
743	PAYAS	HATAY	0.52932605
767	REYHANLI	HATAY	0.06847965
788	SAMANDAG	HATAY	0.18836742
930	YAYLADAGI	HATAY	-0.3427217
73	AFSIN	KAHRAMANMARAS	-0.1105108
135	ANDIRIN	KAHRAMANMARAS	0.34519079
62	CAGLAYANCERIT	KAHRAMANMARAS	1.35852126
339	DULKADIROGLU	KAHRAMANMARAS	0.3238271
356	EKINOZU	KAHRAMANMARAS	-0.5252326

ID	District	Provinces	Mean displacement (cm)
361	ELBISTAN	KAHRAMANMARAS	0.17383451
434	GOKSUN	KAHRAMANMARAS	-0.1745358
709	NURHAK	KAHRAMANMARAS	-0.254048
719	ONIKISUBAT	KAHRAMANMARAS	-0.0687263
746	PAZARCIK	KAHRAMANMARAS	-0.5938777
886	TURKOGLU	KAHRAMANMARAS	0.21522621
362	ELBEYLI	KILIS	
597	KILIS	KILIS	0.32038575
693	MUSABEYLI	KILIS	-0.0244272
759	POLATELI	KILIS	
80	AKCADAG	MALATYA	-0.7310236
146	ARAPGIR	MALATYA	0.41361249
151	ARGUVAN	MALATYA	-2.7471812
227	BATTALGAZI	MALATYA	0.72810428
305	DARENDE	MALATYA	1.28275382
329	DOGANSEHIR	MALATYA	-0.0731384
332	DOGANYOL	MALATYA	
503	HEKIMHAN	MALATYA	-0.6410246
535	KALE	MALATYA	2.71005614
638	KULUNCAK	MALATYA	-0.7939879
763	PUTURGE	MALATYA	0.29836773
932	YAZIHAN	MALATYA	0.8761919
936	YESILYURT	MALATYA	-0.0445607
213	BAHCE	OSMANIYE	0.80701105
343	DUZICI	OSMANIYE	-0.2430186
492	HASANBEYLI	OSMANIYE	1.52672616
529	KADIRLI	OSMANIYE	-0.1232149
732	OSMANIYE	OSMANIYE	0.45868318

ID	District	Provinces	Mean displacement (cm)
850	SUMBAS	OSMANIYE	-0.1467543
879	TOPRAKKALE	OSMANIYE	0.50310965
81	AKCAKALE	SANLIURFA	
199	BIRECIK	SANLIURFA	0.11474552
271	BOZOVA	SANLIURFA	-0.0306986
290	CEYLANPINAR	SANLIURFA	
401	EYYUBIYE	SANLIURFA	
482	HALFETI	SANLIURFA	0.04359413
481	HALILIYE	SANLIURFA	
491	HARRAN	SANLIURFA	
473	HILVAN	SANLIURFA	
553	KARAKOPRU	SANLIURFA	
781	SIVEREK	SANLIURFA	
853	SURUC	SANLIURFA	-0.0326162
914	VIRANSEHIR	SANLIURFA	

Source: Administrative boundaries HDX, 2019 modified to comply with UN, 2020.

# Rapid geospatial assessment after the earthquake in Türkiye in 2023

Impacts on infrastructure and farming community during the period February-March 2023

Türkiye is located in an active seismic zone, and earthquakes are not uncommon in the country. The government and local authorities have taken measures to strengthen buildings and infrastructure in order to minimize the risk of damage from earthquakes, but the region remains vulnerable to seismic activity. On 6 February 2023 at 4.17 am local time, a 7.8-magnitude earthquake occurred near the city of Gaziantep in southern Türkiye. Its tremors were felt in the provinces of Syria, Lebanon, Cyprus and Iraq. A rapid geospatial assessment has been conducted to assess the impact of the earthquakes on the agricultural sector by Geospatial Unit in Land and Water Division at FAO. Geospatial data from publicly available satellite imageries, very high-resolution aerial photographs, and information from national portals were collected and analyzed to assess the impact of the earthquake. The data were processed and analyzed using geospatial cloud computing tools.

This report provides results on (1) damage proxy map (2) exposed population, (3) farmers exposure to earthquake, (4) map of cultivated land with 3 classes at 10 m resolution (Horticulture, Rainfed and irrigated), (5) Impacted agriculture infrastructure, (6) deformation map.

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