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SPATIAL AND TEMPORAL DISTRIBUTION OF NATURAL DISASTERS

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Abstract: The subject of quantitative research is determining the spatial and temporal distribution of natural disasters worldwide for the period 1900-2013. Considering that it is a mass phenomenon, which consists of multiple units, most preferred scientific method for making conclusions on natural disasters is the statistical method. Thereby, a statistical survey has been conducted in the way that raw data about all natural disasters in the first step were downloaded (25.552) in the form of Excel file from the international database on disasters (CRED) in Brussels, and then analyzed in program for statistical analysis of data SPSS. Within the geospatial distribution the total number and consequences of natural disasters were analyzed by continents. According to the same principle, within temporal analysis we examined distribution of the total number and effects of natural disasters on annual, monthly and daily levels. Statistical results of analysis clearly indicate that the number of natural disasters has increased, with their recorded maximum in the period from 2000 to 2013. Certainly, one can not absolutely say this is true in view of starting to pay serious attention to quantitative indicators. Also, it can not be said that the international database (CRED) included absolutely all natural disasters in the world, considering that it was created thanks to the submission of national reports on natural disasters. Such way of data collection can have serious shortcomings, given the diverse subjectivities. In addition, the question that arises is whether most underdeveloped countries submitted their reports. Bearing in mind the increasing trend in the number and severity of natural disasters in the global geographic space, the survey results represent a good argument for initiation of serious reforms of the system of protection and rescue against natural disasters in countries around the world. Results of research impact on raising awareness among citizens about the seriousness of the consequences of natural disasters to humans, environment and their property.

Keywords: security, emergencies, natural disasters, statistical analysis.

Introduction

Natural disasters are vague term that often causes serious scientific controversies and discussion. Its often interference with terms such as natural hazards, natural extraordinary events, natural emergencies and crises are only one dimension of such controversies. After examining the large number of papers of famous

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authors in the field of disasters, it is noted that the researchers periodically focus on one or more analytical dimensions (e.g., duration of impact) in an attempt to compare the problems that result from different types of natural disasters (Barton, 1970; Dynes, 1970; Drabek, 1970; Perry, 1970; Quarantelli, 1980). In addition, all these authors proceeded from Fritz's (1961) definition that was worthy of respect and that is known for having emphasized the consequences of specific events. According to it, natural disasters are: a) events which may be defined in time and space, which performing b) the impact on v) social units and social units, in turn, prescribe g) responses (or adjustment) to these impacts (Kreps, 1984).

Other researchers have emphasized the physical side of disasters and the need to prevent or mitigate potentially catastrophic events and, therefore, they have replaced the term with equally "elusive", phrase such as "natural and technological risks" (Burton, Kates & White, 1978) or "extremes of environment" (Militia, Drabek & Haas, 1975). Despite the whole confusion about what is or is not a disaster, most authors mean on the physical impacts or problems in the human community caused by unplanned and socially disruptive events. Center for Research on the Epidemiology of Disaster (CRED) defines a disaster as: a situation or event which exceeds local capacities, which requires assistance at the national or international level, unforeseen and often sudden event that causes great damage, destruction and human suffering (CRED, 2013).

The most obvious characteristics of such events are the ones that can seriously harm people and the physical environment; their occurrence is (or at least an indication of their occurrence, in case of natural disasters that have a slow onset) sudden and acute; and it is possible to undertake something that will mitigate their consequences in the period before or after their occurrence (Erikson, 1976: 43; Dragićević & Filipović, 2009).

Natural disasters are different from natural hazards, which are generated only when they threaten people and their material goods (Shneid, 2001; Wisner, 2004; Hyndman & Hyndman, 2011; Bimal, 2012). More specifically, natural disasters are caused by the impact of natural hazards to people, property, infrastructure and natural resources (Shaluf, 2007: 690). These are events that have a large and tragic impact tosociaty, impair the normal ways of life, hinder the economic, cultural, and sometimes political conditions of life and delay the development community (Dragićević & Filipović, 2009). In recent decades, it has not been only evident trend of increasing number of natural disasters, but there is an increase in their destructiveness as well (Cvetković, 2014a; Cvetković, 2014b; Cvetković, 2014c; Cvetković, 2014d; Mijalković &

Cvetković, 2013; Zorn & Komac, 2011). The number of natural disasters has increased, while the dynamics and mode of natural hazards are almost unchanged. These types of events have huge and tragic influence on society, distort the common ways of life, hinder the economic, cultural, and sometimes political conditions of life and delay the development of the community and require taking special measures by first responders in emergency situations (Cvetković, 2013:6).

Therefore, subject of quantitative research is the identification of geospatial and temporal distribution of natural disasters in the world geospace for the period 1900–2013.

Methods

The research was conducted on the basis of an extremely large amount of material of Center for Research on the Epidemiology Disasters (CRED). In the first step, raw data in the form of "Excel" file with 25.552 registered events were downloaded from the official web site of the Center (www.emdat.be, accessed: June 5, 2013). A natural event will be included in the base of natural disasters if fulfils at least one of the following criteria: 10 or more people were killed; 100 or more people were affected; emergency was declared; international assistance was requested (CRED, 2013).

After downloading, the data were processed by program for statistical data processing "IBM SPSS Advanced Statistics 20.0". Using the program operations we calculated frequencies and percentages of considered variables such as killed persons, injured persons, persons affected by the emergency situation, persons left homeless during emergency etc. Also, using the program we made tables and charts, which were further processed in "MS Word 2013". Results of processing quantitative data were presented in textual, tabular and graphical forms.

The meanings of terms that are used in the paper are: the death toll the number of people with confirmed death and the number of missing, apparently dead people, the number of injuries the number of people suffering from psychological injury, or trauma requiring immediate medical attention; the number of affected the number of people requiring immediate assistance during and after a disaster, including deployed or evacuated people, homeless the number of people who need emergency accommodation because they ran out of his house, the affected toll a summary of injured, homeless and affected, the total damage a global picture of the economic impact of natural disasters, given in U.S. dollars.

Table 1. Summary of total number and consequences of various natural disasters to people for the period 1900–2013

Type of natural disasters	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
Earthquakes	2.5	5,128.3	5,152.9	299,445.2	45,166.7	1,515,959.9
Mass Movement (Dry)	0.1	10.0	1.0	45.4	12.0	5.0
Volcanic eruption	0.5	192.6	23.2	9,789.1	75.2	6,080.7
Floods	8.3	13,867.2	2,634.4	6,872,264.9	176,755.7	1,183,103.0
Mass Movement (Wet)	1.2	120.0	20.7	18,907.3	8,467.4	16,900.0
Epidemics	0.3	19,152.3	968.2	89,320.9	0.0	0.0
Insect Infestation	0.2	0.0	0.0	1,004.4	0.0	46.0
Droughts	1.3	23,422.5	0.0	4,330,395.3	0.0	249,596.8
Extremes of temperature	1.0	3.4	3,768.9	191,024.5	50.1	115,054.7
Wildfires	0.7	7.3	10.7	11,525.8	363.3	107,114.1
Storms	7.1	2,766.9	2,641.2	1,742,924.8	105,054.9	1,872,273.2

Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

In the period from 1900 to 2013 there were 25.552 natural disasters. Most of them were hydrological, then meteorological, geophysical, climatic and biological disasters (Cvetković, 2014; Cvetković, Milojković & Stojković, 2014). During these disasters, 65,009,766 were killed, 15,221,227 injured, 13,566,647,548 affected, 337,112,287 people were left homeless. The total damage amounted to 5,066,645,713 US dollars. During this period, floods were the most frequent (8,331), while landslides and rockfalls were the rarest (110). The largest number of people was killed (23,422,542) due to droughts, injured (3,768,924) due to temperature extremes, affected (6,872,264,928) due to flooding. The largest number of people was left homeless (176,755,739) due to flooding. The highest total damage (1,872,273,246) is caused by storms. On the other hand, the smallest number of people was killed (0) due to infection of insects, injured (0) due to infection of insects and droughts (of course, it raises the question about the absolute accuracy of the findings, given the shortcomings of the database) affected (45,376) due to landslides and rockfalls. The lowest number of people was left homeless (0) due to epidemics and infections of insects. The lowest total loss (14,000) occurred due to epidemics (Table 1).

In the period from 1900 to 2013 in the global geographic space, annually there were 694 floods, 596 storms, 221 epidemics, 206 earthquakes, 106 droughts, 102 tsunamis and floods, 81 extreme temperatures, 62 forest fires, 38 volcanic eruptions, 14 infections of insects and 9 landslides and rockfalls. Observed at the aggregate level, annually there were 2,129 natural disasters, 65,009,766 were killed, 15,221,227 injured and 13,566,647,548 people were affected. 337,112,287 people were left homeless. Total damage amounted to 5,066,645,713 US dollars (Table 2).

Table 2. Summary of the number and consequences of various natural disasters to people, on an annual basis, for the period from 1900 to 2013

Type of natural disasters	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
Earthquakes	0.2	427.4	429.4	24,953.8	3,763.9	126,330.0
Mass Movement (Dry)	0.0	0.8	0.1	3.8	1.0	41.9
Volcanic eruption	0.0	16.1	1.9	815.8	62.6	506.7
Floods	0.7	1,155.6	219.5	572,688.7	14,729.6	98,591.9
Mass Movement (Wet)	0.1	10.0	1.7	1,575.6	705.6	1,408.3
Epidemics	0.2	1,596.0	80.7	7,443.4	0.0	1.2
Insect Infestation	0.0	0.0	0.0	83.7	0.0	3.8
Droughts	0.1	1,951.9	0.0	360,866.3	3.3	20,799.7
Extremes of temperature	0.1	28.6	314.1	15,918.7	41.7	9,587.9
Wildfires	0.1	0.6	0.9	960.5	30.3	8,926.2
Storms	0.6	230.6	220.1	145,243.7	8,754.6	156,022.8

Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

Observed monthly, there were 23 floods, 20 storms, 7 epidemics, 7 earthquakes, 4 droughts, 3 tsunamis and floods, 3 extreme temperatures, 2 forest fires, 1 volcanic eruption, 0.4 infections of insects and 0.3 landslides and rockfalls. Observed at an aggregate level, monthly there were 71 natural disasters, 180,583 were killed, 42281 injured and 37,685,132 people were affected. 936,423 people were left homeless. Total damage amounted to 14,074,016 US dollars (Table 3).

Based on the collected and processed data on geospatial distribution from the database it can be said that the largest number of natural disasters for the period 1900-2013 occurred in Asia, 5,984, and the lowest number in Oceania, 884. Observing all the continents, Asia (5,984) is in the first place by natural

disasters, followed by America (4,128), Africa (2,970), Europe (2,029) and Oceania (884) (Table 4).

Table 3. Summary of the number and consequences of various natural disasters to people, on a monthly basis, for the period 1900 - 2013

Type of natural disasters	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
Earthquakes	0.01	14.25	14.31	831.79	125.46	4,211.00
Mass Movement (Dry)	0.00	0.03	0.00	0.13	0.03	1.40
Volcanic eruption	0.00	0.54	0.07	27.19	2.09	16.89
Floods	0.02	38.52	7.32	19,089.63	490.99	3,286.40
Mass Movement (Wet)	0.00	0.33	0.06	52.52	23.52	46.94
Epidemics	0.01	53.20	2.69	248.11	0.00	0.04
Insect Infestation	0.00	0.00	0.00	2.79	0.00	0.13
Droughts	0.00	65.06	0.00	12,028.88	0.11	693.32
Extremes of temperature	0.00	0.95	10.47	530.62	1.39	0.00
Wildfires	0.00	0.02	0.03	32.02	1.01	297.54
Storms	0.02	7.69	7.34	4,841.46	291.82	5,200.76

Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

Table 4. Summary of the total number and consequences of natural disasters to people for the period 1900-2013, classified by continents

Continent	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
Africa	3.0	2,682.0	153.2	763,002.7	30,871.6	39,308.6
America	4.1	1,398.7	5,301.2	308,098.0	27,448.0	1,677,032.4
Asia	6.0	38,650.2	5,958.9	5,415,013.2	142,935.3	1,577,816.9
Europe	2.0	8,255.8	163.3	61,697.7	39,249.0	452,246.9
Oceania	0.9	36.0	21.4	39,311.0	706.2	120,638.1

Source: Author’s calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

As a consequence of natural disasters, viewed by continents, the largest number of fatalities was in Asia (71.05%), followed by America (17.13%), Europe (10.85%), and at the end was Oceania (0.13 %). Arrangement of continents is the same when considering other consequences, so that Asia had the highest number of injured (65.97%), affected (77.28%) and homeless people (70.44%). In addition to the lowest number of killed people Oceania had the lowest number

of injured (0.12%), affected (0.46%) and homeless people (0.09%) due to the consequences of tsunamis (Figure 1).

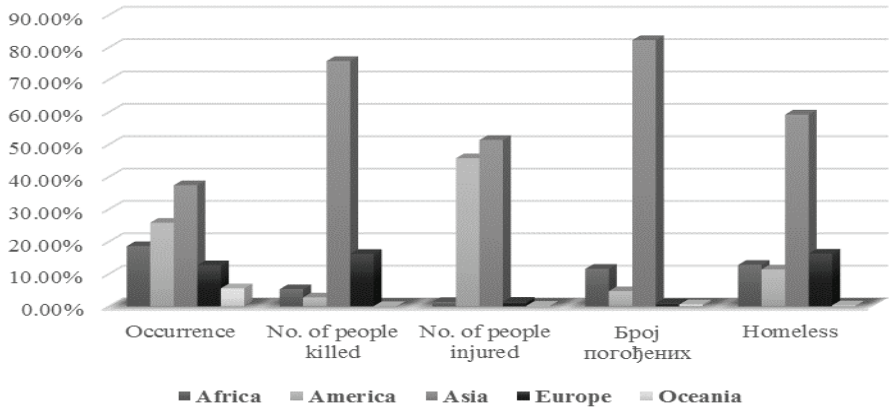


Figure 1. Percentage review of the consequences of natural disasters to people for the period 1900-2013, classified by continents. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

In percentage terms, the highest percentage of natural disasters (37.41%) occurred in Asia, while the lowest one (5.53%) was in Oceania. This situation is the same when looking at the number of fatalities. The highest percentage of killed people (75.75%) was in Asia, and the lowest percentage (0.07%) in Oceania. When considering the number of injuries, the largest number (51.38%) was in Asia, and the smallest one (0.18%) in Oceania. The largest number of affected (82.21%) people was in Asia, and the lowest one (0.60%) in Oceania. The largest number of people left homeless (59.26%) was in Asia and the smallest (0.29%) in Oceania (Figure 1).

Analysis of temporal distribution of floods

In the period from 1900 to 2013, focusing on the ten-year periods, the largest number of natural disasters (10,240) occurred from 2000 to 2013, and the smallest number (162) from 1910 to 1920. Of that, the largest number of fatalities occurred from 1900 to 1910 (12,764,966) and the smallest (973,794) in the period from 1990 to 2000. The largest number of injured people (8,268,219) was in the period from 2000 to 2013, and the smallest number (82) from 1900 to 1910. The largest number of affected people (5,306,219,458) due to the consequences of natural disasters was in the period from 2000 to 2013, and the smallest (566,000) from 1900 to 1910. In the period from 2000 to 2013, the

largest number of people (152,128,062) was left homeless and this number was the smallest (140,200) in the period from 1940 to 1950 (Table 5).

Table 5. Summary of the total number and effects of natural disasters to people and property in the period 1900–2013, classified by decades

Year	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
1900-1910	0.5	9,221.6	0.1	566.0	22.0	2,613.5
1910-1920	0.2	12,765.0	5.3	51,270.0	195.0	1,240.0
1920-1930	0.3	11,064.9	222.7	48,324.0	181.1	2,078.5
1930-1940	0.2	9,429.6	124.1	20,177.0	7,532.1	6,700.0
1940-1950	0.4	7,713.9	98.7	27,221.5	140.2	6,379.4
1950-1960	0.7	4,316.2	84.1	21,650.3	1,536.9	14,197.6
1960-1970	1.3	4,197.4	1,867.3	467,281.6	18,982.8	40,516.9
1970-1980	1.9	1,250.9	895.9	1,128,905.8	48,022.5	167,281.0
1980-1990	3.8	1,647.8	775.9	2,445,422.8	45,135.9	404,777.9
1990-2000	6.3	973.8	2,878.9	4,010,422.7	152,128.1	1,387,430.3
2000-2013	10.2	2,356.7	8,268.2	5,306,219.5	63,257.6	3,029,352.6

Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

The largest number of killed people (19.66%) was in the period from 1910 to 1920, while the smallest (1.50%) was in the period from 1990 to 2000 (0.58%). The largest number of injured people (54.52%) was in the period from 2000 to 2013 (51.40%), while the smallest number of injured people (0%) was in the period from 1900 to 1910. The largest number of affected people (39.23%) was in the period from 2000 to 2013, and the lowest (0.02%) in the period from 1900 to 1920. The largest number of people (45.12%) was left homeless in the period from 1990 to 2013, and the smallest number of people left homeless (0.01) was in the period from 1900 to 1910. The highest damage (59.84%) due to the consequences of natural disasters occurred in the period from 2000 to 2013, and the lowest (0.04%) in the period from 1920 to 1930 (Figure 2).

In the period from 1900 to 2013, focusing on the two-decade periods, the largest number of natural disasters (10.240) occurred in the period from 2000 to 2013, and the smallest number (506) from 1920 to 1940. Of that, the largest number of fatalities (21,986,534) was from 1900 to 1920, and the smallest (2,356,654) in the period from 2000 to 2013. The largest number of injured people (8,268,219) was in the period from 2000 to 2013, and the lowest (5,414) from 1900 to 1920. The largest number of affected people (6,455,845,454) was in the period from 1980 to 2000, and the smallest (48,871,792) from 1940 to 1960. In the period from 1980 to 2000, the largest number of people was left homeless

(197,263,980), while the smallest recorded number (217,040) was in the period from 1900 to 1920 (Table 6).

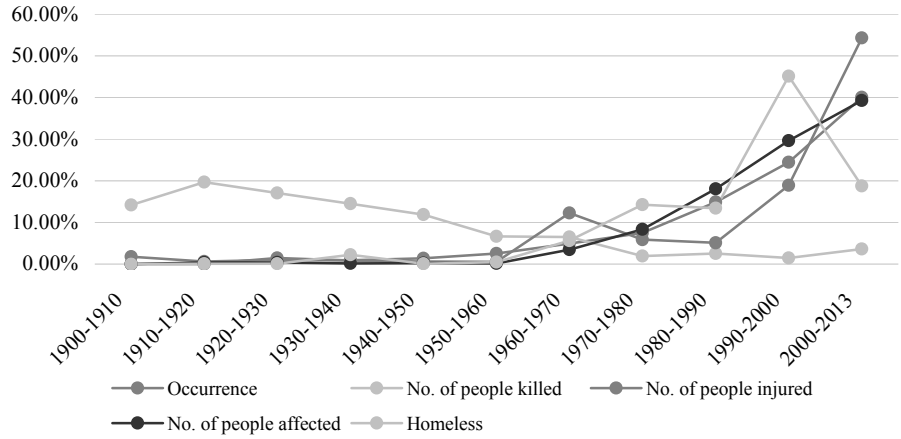


Figure 2. Percentage review of the effects of natural disasters to people and property for the period 1900-2013, classified by decades. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

Table 6. Summary of the total number and effects of natural disasters to people and property in the period 1900-2103, classified by periods of twenty years

Year	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
1900-1920	0.6	21,986.5	5.4	51,836.0	217.0	3,853.5
1920-1940	0.5	20,494.5	346.8	68,501.0	7,713.2	8,778.5
1940-1960	1.0	12,030.1	182.7	48,871.8	1,677.1	20,577.0
1960-1980	3.2	5,448.3	2,763.2	1,596,187.5	67,005.3	207,797.9
1980-2000	10.1	2,621.6	3,654.9	6,455,845.5	197,264.0	1,792,208.2
2000-2013	10.2	2,356.7	8,268.2	5,306,219.5	63,257.6	3,029,352.6

Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

In percentage terms, the highest percentage of natural disasters (40%) occurred in the period from 2000 to 2013, and the lowest (1.98%) in the period from 1920 to 1940. The largest percentage of killed people (31.56%) was in the period 1900 to 1920, while the lowest (3.63%) was in the period from 2000 to 2013. The highest percentage of injured people (54.32%) was in the period from 2000 to 2013, while the lowest (0.04%) was in the period from 1900 to 1920. The highest percentage of affected people (47.72%) was in the period from 1980 to 2000, and the lowest (0.38%) in the period from 1940 to 1960. The highest

percentage of people (58.51%) was left homeless in the period from 1980 to 2000, and lowest percentage (0.06%) was left homeless in the period from 1900 to 1920. The largest damage (59.84%) due the consequences of natural disasters occurred in the period from 2000 to 2013, while the lowest (0.08%) was in the period from 1900 to 1920 (Figure 3).

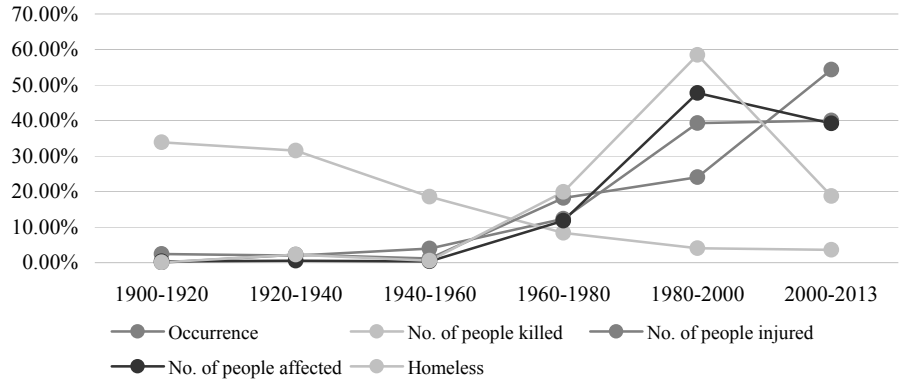


Figure 3. Percentage review of the effects of natural disasters to people in the period from 1900 to 2013, classified by periods of twenty years
Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database.

Table 7. Overview of the total number and effects of natural disasters to people in the period 1900-2013, divided into two periods, from 1900 to 1950 and from 1950 to 2013

Year	Occurrence	No. of people killed	No. of people injured	No. of people affected	Homeless	Estimated damage ($)
1900-1950	1.5	50,194.9	450.9	147,558.5	8,070.5	19,011.4
1950-2013	24.1	14,742.7	14,770.4	13,379,902.7	329,063.8	5,043,556.3

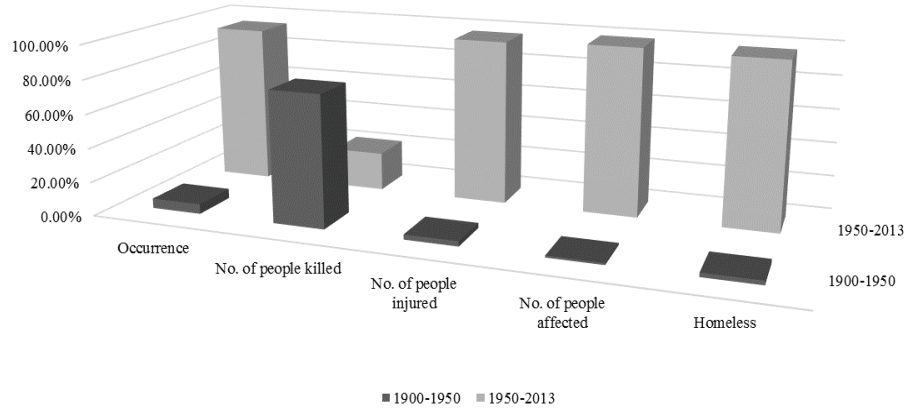
Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

In the period from 1900 to 2013, focusing on the five-decade periods, the largest number of natural disasters (24,130), injured people (14,770,353), affected people (13,379,902,670) and left homeless (329,063,807) was in the period from 1900 to 1950. Also, during this period the consequences of natural disasters caused loses in the amount of 5,043,556,342 US dollars. In contrast to the above-mentioned period, from 1950 to 2013 there were 1,472 natural disasters, 50,194,928 killed, 450,874 injured, 147,558,508 affected people and also 8,07048 million people who were left homeless. During this period, the

consequences of natural disasters caused the damage in the amount of US $ 19,011,360 (Table 7).

In percentage terms, in the period from 1900 to 1950, related to the total number, there were 5.75% of natural disasters, 77.30%, of killed, 2.96% of injured, 1.09% of affected people, 1.12% of people were left homeless and total damage was 0.38%. Unlike that period, from 1950 to 2013, there were 94.25% of natural disasters, 22.70% of killed, 94.25% of injured, 97.04% of affected people, 97.61% of people who were left homeless and total damage was 99.62% (Figure 4).

Figure 4. Percentage review of the effects of natural disasters to people for the period 1900-2013, divided into two periods: from 1900 to 1950 and from 1950 to 2013



Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

Quantitative analyzes of natural disasters by types indicates that in the period from 1900 to 2013, floods were the most frequent (35%), and landslides and rockfalls were the rarest (0.47%). Flood were followed by storms (30.86%), earthquakes (10.68%), droughts (5.51%), tsunamis and floods (5.29%), extreme temperatures (4.19%), forest fires (3.20%), volcanic eruptions (1.95%), epidemics (1.14%), infections of insects (0.73%), landslides and rockfalls (0.47%) (Figure 5).

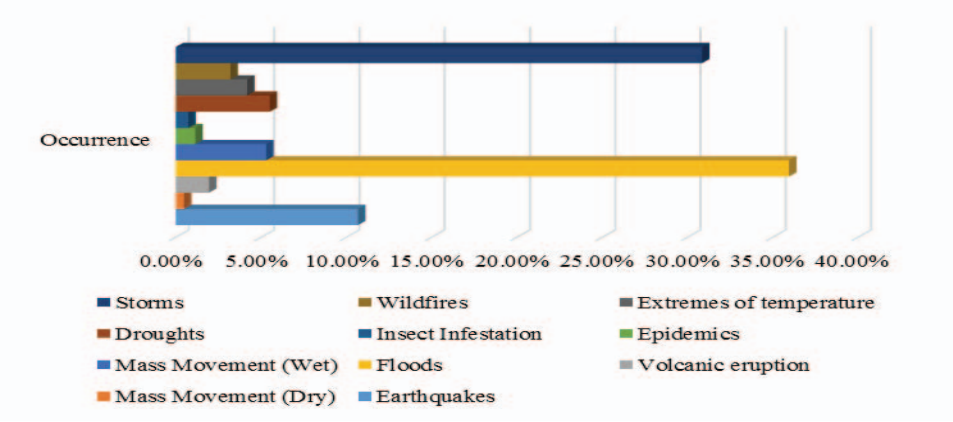


Figure 5. Percentage review of total number of natural disasters to people for the period 1900 - 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database.

Quantitative analyzes of natural disasters by the number of killed people indicates that in the period from 1900 to 2013, the largest number of killed people due to the consequences of natural disasters was caused by droughts (36.22%) and the smallest number due to insect infections (0%). Hence, bt the number of killed people in the first place were droughts (36.22%), followed by epidemics (29.62%), floods (21.44%), earthquakes (7.93%), thunderstorms (4.28%), landslides and rockfalls (0.47%), volcanic eruptions (0.30%), tsunamis and floods (0.19%), extreme temperatures and wildfires (0.01%) and infections of insects (0%) (Figure 6).

Quantitative analyzes of natural disasters by the number of injured people indicates that in the period from 1900 to 2013, the largest number of injured people due to the consequences of natural disasters was caused by earthquakes (33.85%). Earthquakes were followed by extreme temperatures (24.76%), thunderstorms (17.35%), floods (17.31%), epidemics (6.36%), volcanic eruptions (0.15%), tsunamis and floods (0.19%), forest fires (0.07%), landslides and rockfalls (0.01%) and at the end were droughts and insect infections (0.01%) (Figure 7).

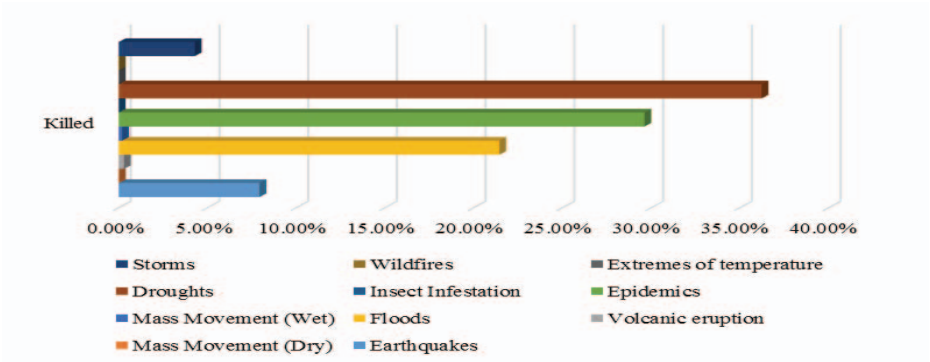


Figure 6. Percentage review of the number of people killed by natural disasters in the period from 1900 to 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

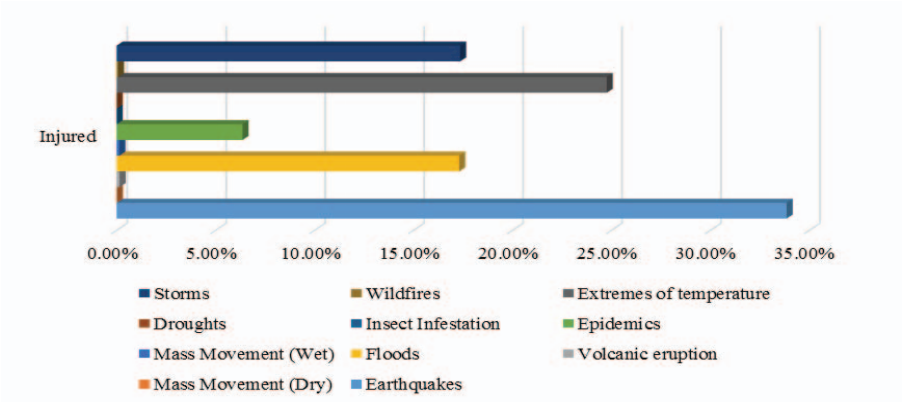


Figure 7. Percentage review of the number of injured people due to natural disasters in the period from 1900 to 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

Quantitative analyzes of natural disasters by the number of affected people indicates that in the period from 1900 to 2013, the largest number of affected people due the consequences of natural disasters was by floods (50.66%). Floods were followed by droughts (31.92%), thunderstorms (12.85%), earthquakes (2.21%), extreme temperatures (1.41%), epidemics (0.66%), tsunamis and floods (0.14%), forest fires (0.08%), volcanic eruptions (0.07%), infections of insects (0.01%) and landslides and rockfalls (0%) (Figure 8).

Quantitative analyzes of natural disasters by the number of people who were left homeless indicates that in the period from 1900 to 2013, the largest number of people left homeless due to the consequences of natural disasters was by floods

(52.61%) and the smallest number by epidemics, infections of insects, landslides and rockfalls and droughts (0%). Thus, by the number of people who lost their homes in the first place were floods (50.66%), then thunderstorms (31.27%), earthquakes (13.14%), tsunamis and floods (2.52%), forest fires (0.11%), volcanic eruptions (0.02%), extreme temperatures (0.01%) and at the end were epidemics, insect infections, landslides and rockfalls and droughts (0%). (Figure 9).

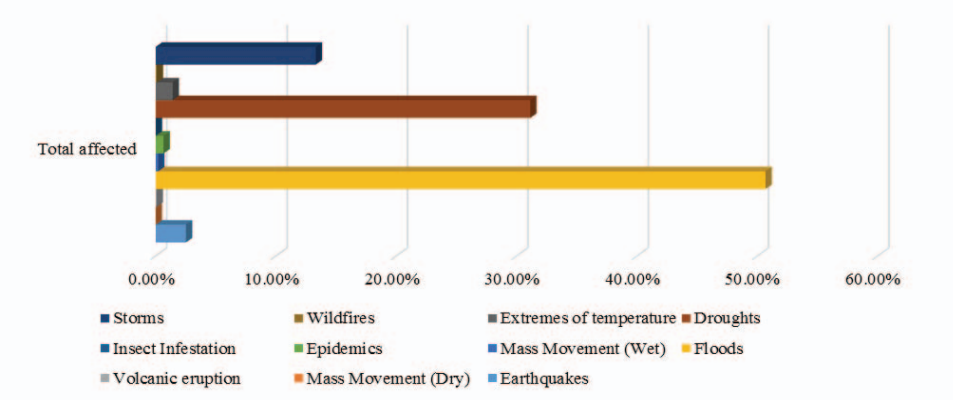


Figure 8. Percentage review of affected people due to natural disasters in the period from 1900 to 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database

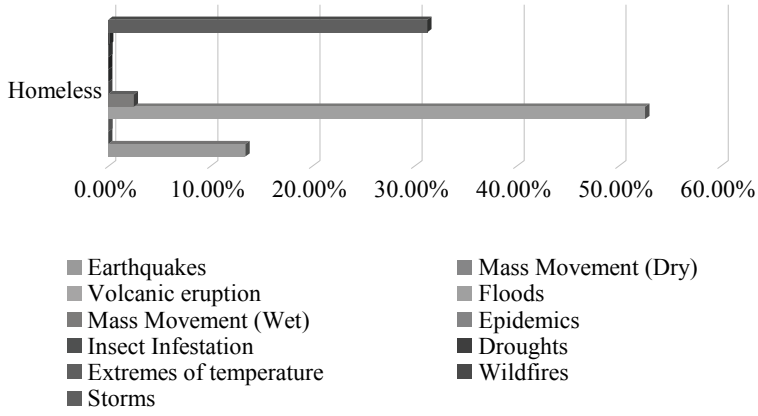


Figure 9. Percentage review of homeless caused by natural disasters in the period from 1900 to 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database.

Quantitative analyzes of natural disasters by amount of caused material damage indicates that in the period from 1900 to 2013, the highest damage (36.96%) due to the effects of natural disasters was by storms. Storm were followed by earthquakes (29.92%), floods (23.35%), droughts (4.93%), extreme temperatures (2.27%), forest fires (2.11%), tsunamis and floods (0.33%), volcanic eruptions (0.12%) and at the end were landslides and rockfalls, epidemics and insect infections 0%. (Figure 10).

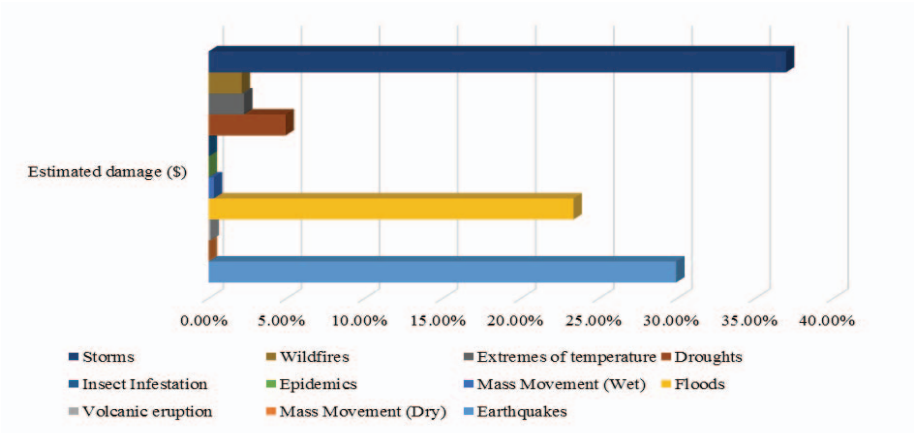


Figure 9. Percentage review of estimated damage caused by natural disasters in the period from 1900 to 2013. Source: Author's calculations based on data from EM-DAT: The OFDA/CRED International Disaster Database.

Conclusion

After the analysis of natural disasters, the following conclusions were made:

- In the period from 1900 to 2013, there were 25.552 natural disasters. During these disasters, there were 65.009.766 killed, 15.221.227 injured, 13.566.647.548 affected and 337.112.287 left homeless people. The total damage amounted to 5.066.645.713 US dollars; In the reporting period, floods were the most frequent, while the landslides and rockfalls were the rarest.
- The largest number of people was killed due to droughts, injured by extreme temperatures, affected by floods. The largest number of people was left homeless due to floods. Highest total damage was caused by storms; the smallest number of people was killed as a result of infections of insects, injured due to forest fires, affected due to landslides and rockfalls, people who lost their homes due to the epidemics, infections of insects and landslides and rockfalls, caused

material damage was caused by epidemics, infections of insects and landslides and rockfalls;
- The largest number of natural disasters occurred in Asia, and the smallest in Oceania. Accordingly, the distribution of consequences by continents is similar; Looking at the time continuum, the largest number of natural disasters occurred from 2000 to 2013, and the smallest number from 1910 to 1920. Of that, the largest number of fatalities was from 1900 to 1910, and the smallest in the period from 1990 to 2000.
- The largest number of the injured was in the period from 2000 to 2013 and the smallest from 1900 to 1910. The largest number of the affected due to the consequences of natural disasters was in the period from 2000 to 2013 and this number was the smallest from 1900 to 1910. In the period from 2000 to 2013, the largest number of people was left homeless, while this number was smallest in the period from 1940 to 1950.

Statistical results clearly indicate the severity of the increase in the number and effects of natural disasters. These results can be used as a serious argument in order to stimulate the capacities of countries to deal with natural disasters.

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