Impact Of Disasters on Human Life

Introduction

A disaster is a major event that occurs over a short or long period of time and results in widespread human, material, economic, or environmental loss. Natural, man-made, and technical risks as well as various elements that influence a community's exposure can all contribute to disasters.

Natural disasters are physical occurrences that occur in nature.
They are categorized as follows:

- **Hydrological:** For example, Flash floods, Tsunami.
- **Climatological**: For example, Droughts, wildfires.
- **Meteorological**: For example, Hail, Storms.
- **Biological**: For example, disease outbreaks and insect/animal plagues, COVID-19.
- **Geophysical:** For example, earthquakes, flash floods.

Technological disaster is caused by a technological failure and/or human error in the control or handling of technology and can be classified as man-made disasters since they have an "identifiable cause." For example, oil spills, radiation leaks.

Both natural and technological catastrophes affect millions of people every year, and their consequences can be disastrous. Natural catastrophes may ruin entire countries in an instant, from buildings to the spread of diseases. In disastrous event, one could risk death or serious injury. One could potentially lose one's home, belongings, and sense of community. Also emotional and physical health problems might occur.

Problem Setting

Disasters always been a cause for economic and social loss. According to a survey published, since the past decade, disasters have impacted over 5 billion people, claiming approximately 2 million deaths, and causing US$2.5 trillion in economic losses.

In the past 20 years, 90 percent of major disasters have been caused by a huge number of recorded floods, storms, heat waves, droughts, and other weather events.

Therefore, policymakers across the world should always maintain a stable economic as well as infrastructural contribution towards the prevention, action as well as recovery from the impact of any disaster that occurs. Continuous analysis of the past disasters and their impacts will aid the government in making meaningful predictions and planning for precautious measures for inevitable disasters.

Data Description

The disaster data was sourced from EM-DAT: The International Disasters Database (https://www.emdat.be/database).

The data comprises of disasters that occurred from 2000-2022 across various countries/regions and the number of people affected by them. It has around 5595 records with 35 columns where 20 were numerical, and 15 were categorical.

The economic data was extracted from (https://data.worldbank.org/). The data consists of GDP across various countries over 1960-2022 with years, countries and respective GDPs.

Methodology

The disaster data was first preprocessed as it contained missing values and mismatch of datatypes in few columns. 14 columns contained more than 90% missing values; and were removed. Outliers were removed using boxplots and scatter plots for total deaths and total affected column. The data type of Year, Start Day, Start Month, Start Year, End Day, End Month, End Year was changed from numerical to date-type. A new column named Duration was calculated using the Start and End date columns.

After cleaning, we got 5595 rows and 22 columns, where 6 were numerical, 8 categorical and 8 Date columns. The columns are: Year, Disaster Group, Disaster Subgroup, Disaster Type, Disaster Subtype, Country, Region, Continent, Associated Dis, Start Year, Start Month, Start Day, End Year, End Month, End Day, Total Deaths, No Injured, No Affected, No. Homeless, Total Affected, CPI. In the economic data, we have made preprocessing to the data like pivoting the tables and extracted the required columns. We have also imputed missing data.

To perform visualizations, the columns Total Deaths, Total Homeless and Total Injured were taken into consideration. These columns were visualized across the columns Disaster types, Country, and Year separately. This helped get better understanding of the disasters and their affects in various countries and time periods.

Design Process

Two interactive and dynamic dashboards were built to visualize the data.

The original dashboard's goal was to highlight the impact of various disaster kinds in different nations and years. The user can choose between two filters: one for catastrophe type and the other for year (2012-2021). The Total Deaths, Total Homeless, and Total Injured columns are displayed as dynamic cards. At the middle of the dashboard, a world map depicting total fatalities across nations is presented and linked to the two filters. The map's tooltip also includes a bar chart depicting the number of deaths caused by various sorts of disasters in the country.

There are three time-series graphs that indicate monthly change and are color-coordinated with the dynamic cards. All of them alter dynamically depending on the filter the user selects. Two bar graphs are placed at the end of the dashboard, representing the top 5 disasters based on total deaths and disaster duration.

The aim of the second dashboard was to understand how the disasters affected the GDP of a country. It shows the economic factor (GDP) for top 10 countries. This is further deep dived by checking change in GDP across Years and the total deaths, injured and number of disasters caused, with country as a filter.

Key Insights

Considering the major disasters that caused deaths we have acquired the following insights according to the regions. India has the highest number of deaths caused by disasters across the world. Floods, Heat waves, Cyclones and, Transport were the major disasters contributing to the deaths. This might be because of various factors like, status of the country being developing, population growth, and also environmental factors like pollution and global warming.

Earthquakes seem to be the most dangerous disasters in Nepal, Indonesia as it caused highest number of deaths. Indonesia, the world's biggest island country situated between the Indian and Pacific Oceans, is most effected by tsunamis and earthquakes.

Focusing on pandemic catastrophes, the African nations with the most impact are Congo, Nigeria, and Liberia. Again, underscoring the fact that Africa is still working on developing health-care facilities and that some microorganisms are prevalent in African regions.

The United States has the highest number of wildfire deaths and injuries. Summer is when it peaks, which makes sense. Climate change, as well as the wildland-urban interface, may be contributing causes.