Asian Disaster Reduction Center

Natural Disaster Databook 2021
An Analytical Overview

Table of Contents

List of Figures

1. Introduction

ADRC publishes the *Natural Disaster Databook* annually to provide statistical and analytical perspectives of natural disaster data. ADRC retrieves data from the Emergency Event Database (EM-DAT) in order to better understand the occurrence, deaths, people affected, and economic losses from disaster events (Annex 1: Notes on the Sources of Data). This analytical overview, presented in graphs with explanations, is divided into three key sections:

- In the first section, natural disaster data of 2021 is compared with the annual average data of 1991-2020 both at the Global level and at the regional level (Asia)
- In the second section, climate-related disaster data of 2021 is compared with the annual average data of 1991-2020 both at the Global level and at the regional level (Asia)
- In the third section, COVID-19 situations at the global level and in the ADRC member countries are presented to show the cumulative data of confirmed cases and deaths

Regarding natural disasters in general, the number of occurrences has significantly increased during the last 30 years (1991-2020). This increasing trend is observed globally and in the Asian region. In 2021, the total of disaster occurrences was 436, which is higher than the annual average of 376 during the last 30 years. Flood and storm have consistently shown the highest frequency of occurrence and subsequently with the highest amounts of economic losses. Although the frequency of disaster occurrences has been increasing, the number of deaths from disasters is decreasing. Existing data shows that deaths from disasters in 2021 is 14,442. This is lesser compared to the annual average of 61,086 during the past 30 years (1991-2020). Two implications can be highlighted about this data. On one hand, it could indicate that the disaster risk management (DRM) systems have improved. On the other hand, it could imply that lower deaths in 2021 is simply due to the absence of mass casualty events similar to the Indian Ocean Tsunami (2004) or the Great East Japan Earthquake (2011). In 2021, economic losses from disasters continued to show an increasing trend, and this is hugely concentrated in the high-income or developed countries, such as the United States or Japan. Asia remains to be the most disaster-prone region in the world such that in 2021, the region recorded the highest number of disaster occurrences, particularly in Indonesia (28), India (19), China (17), and the Philippines (14).

Regarding climate-related disasters, the data shows an increasing trend during the last 30 years, and its impacts are becoming more destructive. In 2021 alone, extreme cold waves (e.g., France in April) and heat waves (e.g., Canada in July) were recorded in many parts of

the world. Climate-related disasters, particularly flood, storm, and drought, account for the highest number of people affected as well as economic losses in 2021 – a continuing trend since the last 30 years. With regard to climate-related disasters in Asia in 2021, aside from heat wave, India was severely impacted by floods and cyclones affecting more than 18 million people. Bangladesh and Nepal were hit by floods that impacted millions of people. Floods affected 14 million people in China and over 1 million people in Indonesia. Furthermore, drought has been affecting millions of people during the past 30 years, and it incurred economic losses affecting more than 28 million people in Asia in 2021 alone.

Regarding COVID-19 situation, the data shows declining trends both in the number of cases and the number of deaths globally. The peak was in January 2022 when 23,201,079 cases were recorded during the winter at northern hemisphere. COVID-19 cases and deaths in ADRC member countries also showed a declining trend. Factors contributing to the decline could be attributed to increasing rate of vaccination, weaker strain of the virus, and improvement in the medical system for handing COVID-19 cases.

2. Natural Disaster Data

Using the data from EM-DAT/CRED, UC Louvain, Brussels, Belgium (www.emdat.be) retrieved on 7 July 2022, this section presents the trends in natural disasters both at the global and at the regional (Asia) levels. At each level, disaster impacts are analyzed in terms of occurrence, death tolls, people affected, and economic losses.

2.1 Global Disaster Data

Globally, there has been an increasing trend of disaster occurrence since 1900 (Figure 2.1). Compared with the frequency of disaster occurrence in the 1960s with the present trend, the frequency of disaster occurrence increases as much as tenfold. Some of the key determinants for this increasing trend are population growth and economic development (Annex 2: Key Determinants).

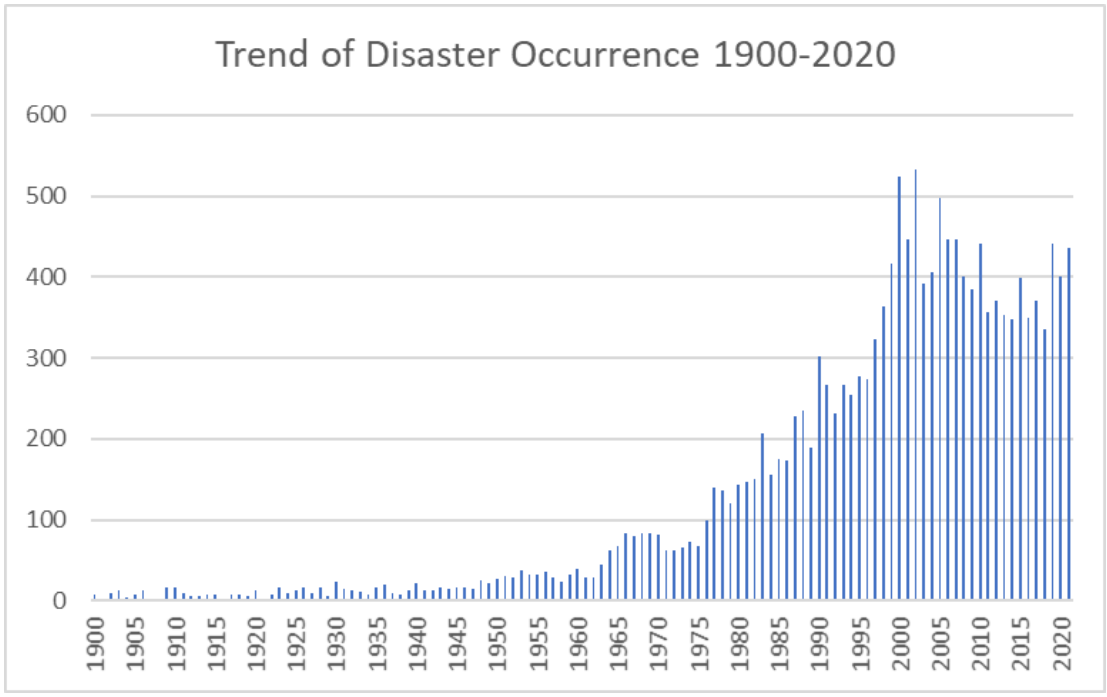

Figure 2.1 Trend of disaster occurrence 1900-2020 (EM-DAT/CRED, 2022)

In 2021, the Asian region exhibited the highest number of disaster occurrences at 40% of the total global occurrences. This figure indicates that Asia remains to be the most disaster-prone region in the world considering that in the last 30 years (1991-2020), the region accounted for 39% of the total disaster occurrences (Figure 2.2).

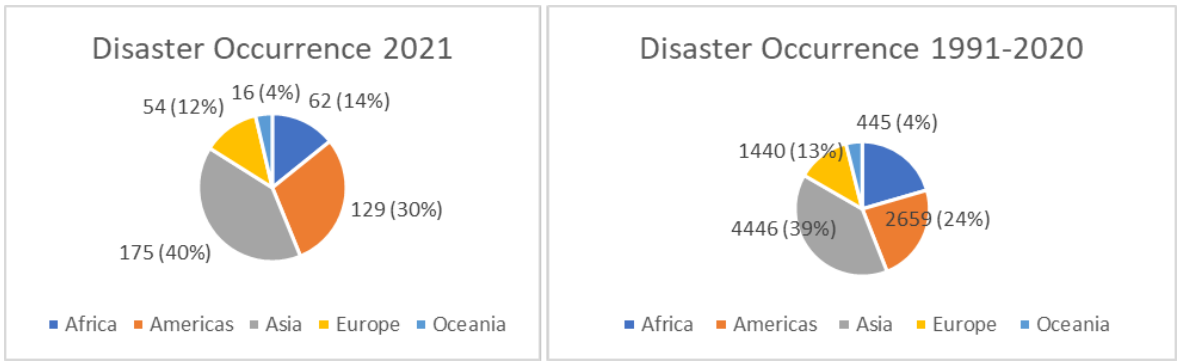

Figure 2.2 Disaster occurrence data by region 2021 vs 1991-2020 (EM-DAT/CRED, 2022)

2.1.1 Occurrence

Around world, EM-DAT recorded a total of 436 natural disaster occurrences in 2021. This number is higher compared with the annual average of 376 disaster occurrence during the last 30 years (Figure 2.3). In particular, flood and storm have consistently shown the highest frequency of occurrence in 2021 and during the last 30 years. Among the most devastating flood and storm events in 2021 were: 1) floods in Maharashtra State, western India, from June to September 2021; 2) heavy flooding in Henan Province, China from 16-20 July 2021; 3) massive flash floods, triggered by heavy rain, in Kamdesh District, Nuristan Province, Afghanistan in July 2021; and 4) Typhoon Rai (local name: Odette) in southeastern part of the Philippines on 16 December 2021.

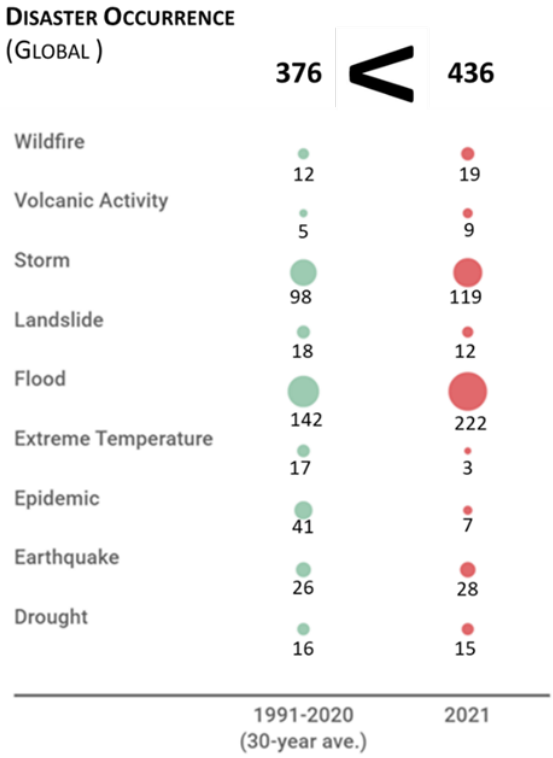

Figure 2.3 Global disaster occurrence 2021 vs 1991-2020 (EM-DAT/CRED, 2022)

2.1.2 Deaths

As shown in Figure 2.4, the total number of people who died from disasters in 2021 is 14,442. This number is lesser compared to the annual average of 61,086 people who died from disasters during the past 30 years (1991-2020). Two implications can be highlighted about this data. On one hand, since the number of deaths from disasters is getting lesser (despite the fact that the number of disaster events is increasing) could indicate that the disaster risk management (DRM) systems may have improved. On the other hand, it could mean that the number of deaths in 2021 is lesser simply because there were no mass casualty events similar to the Hanshin-Awaji Earthquake (1995), the Indian Ocean Tsunami (2004), and the Great East

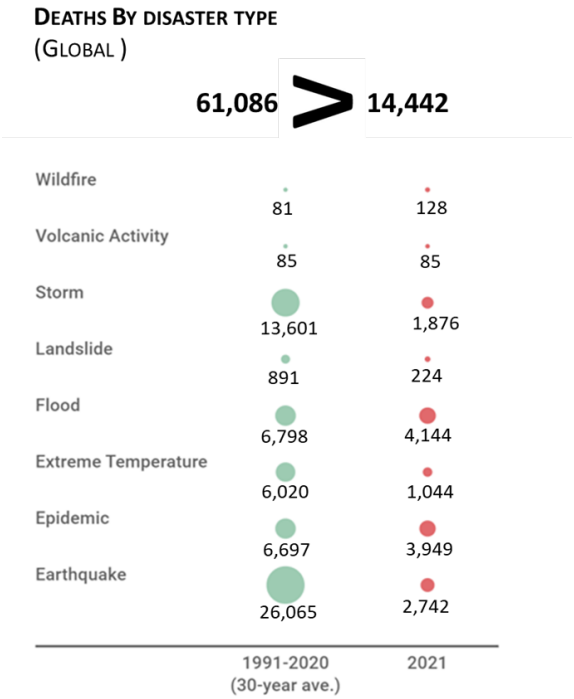

Figure 2.4 Global number of deaths by disaster type (EM-DAT/CRED, 2022)

Japan Earthquake (2011) that occurred during the previous 30 years. However, it should be noted that the number of deaths by wildfire and volcanic eruption has not decreased as the other hazards. This indicates that the challenge of reducing this number of deaths is still there.

2.1.3 People Affected

Overall, the number of people affected by disasters in 2021 is lesser compared to the annual average of the last 30 years (Figure 2.5). It is likely due to the fact that there were more large-scale disasters that occurred during the last 30 years than in 2021. The trend shows that annually, more and more people are affected by flood, drought, and storm. Usually, the locations of people who are highly vulnerable to these climate-related hazards are hugely concentrated in low and middle-income countries – that often have limited capacities for disaster risk reduction (DRR). In particular, drought (which is a slow onset disaster) has been affecting about 57 million people annually since the last 30 years, and still continually affecting low-income countries in 2021.

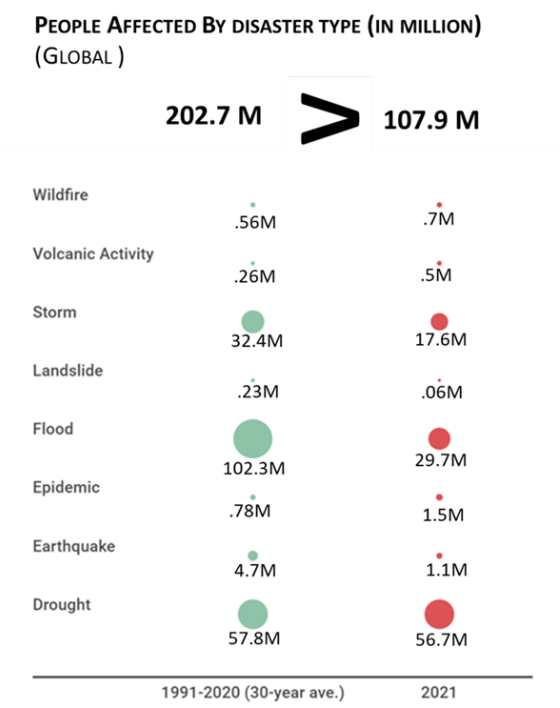

Figure 2.5 Global number of people affected by disaster type (EM-DAT/CRED, 2022)

2.1.4 Economic Losses

Economic losses from disasters in 2021 are higher compared to the annual average of economic losses in the last 30 years (Figure 2.6). EM-DAT data indicates that the huge economic losses from disasters are concentrated in high-income or developed countries (e.g., Japan and United States) due to massive destructions in infrastructures and properties, which subsequently result in business interruption losses.

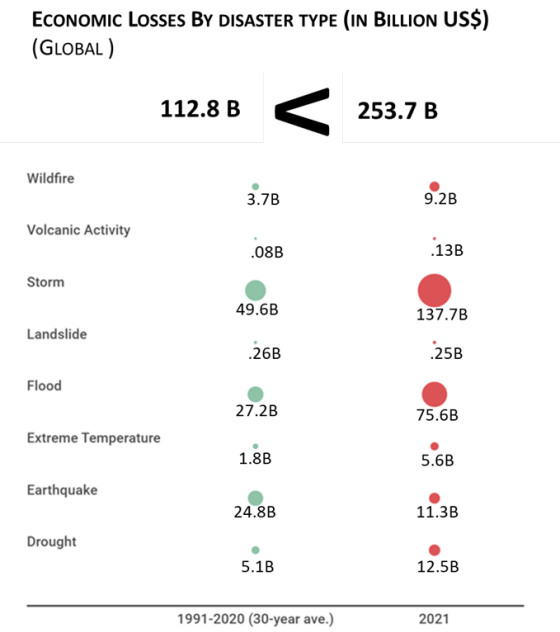

Figure 2.6 Global economic losses (EM-DAT/CRED, 2022)

2.2 Asian Disaster Data

Recognizing that Asia is the most disaster-prone region in the world, ADRC specifically highlights disaster data from this region. In 2021, the top 10 countries in Asia with the highest number of disaster occurrences, include: Indonesia (28), India (19), China (17), and the Philippines (14) among others (Figure 2.7).

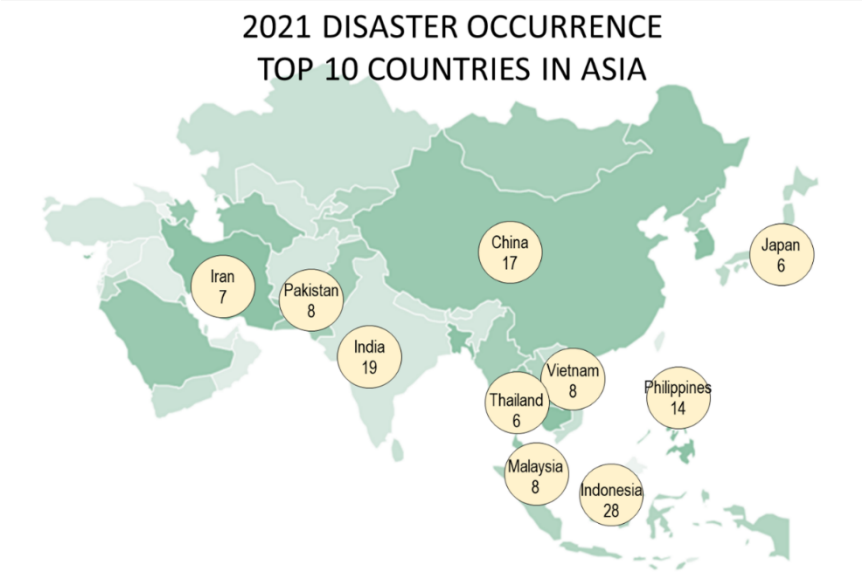

Figure 2.7 Top ten countries in Asia with high disaster occurrence in 2021 (EM-DAT/CRED, 2022)

2.2.1 Occurrence

Disaster occurrence in Asia in 2021 is recorded at 175. This number is higher compared with the annual average of disaster occurrences during the last 30 years (Figure 2.8). Disaster types that have increasing frequency of occurrences are flood, storm, and earthquake. In 2021 alone, seven earthquakes with magnitude 7 or above had occurred in Asia, including the earthquake that hit Davao Oriental in the Philippines on 12 August 2021 of magnitude 7.1.

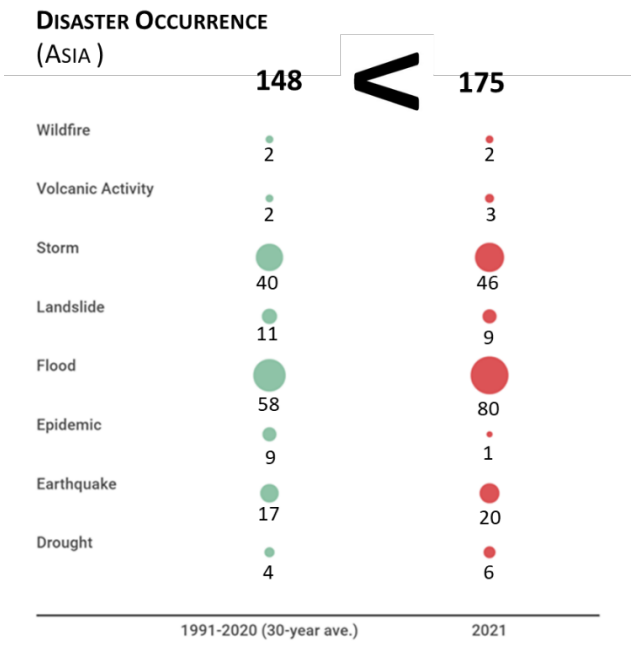

Figure 2.8 Disaster occurrence in Asia (EM-DAT/CRED, 2022)

2.2.2 Deaths

In terms of the number of people killed by disasters, data in Asia showed that lesser people died from disaster in 2021 compared to the annual average of the last 30 years (Figure 2.9). This is consistent with the global trend showing that while the number of disaster occurrences is increasing, the number of people killed from those disasters is decreasing. This implies that countries in Asia may have relatively improved their disaster risk management systems. With regard to the disaster type that caused more deaths, the data shows that flood, storm, and earthquake caused massive casualties.

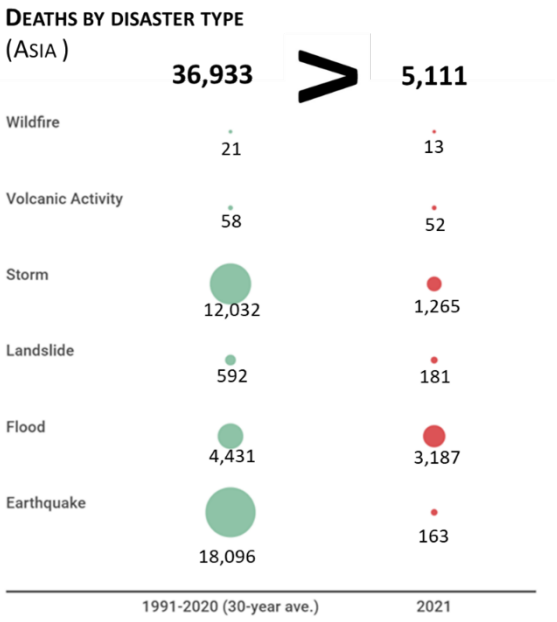

Figure 2.9 People killed by disaster type in Asia (EM-DAT/CRED, 2022)

2.2.3 People Affected

Compared with the annual average number of people affected by disasters in the last 30 years (1991-2020), the number of people affected by disasters in Asia in 2021 is lesser (Figure 2.10). Disaster types that hugely affect people in Asia are flood, drought, and storm. In particular, drought has been consistently affecting high number of people in Asia during the last 30 years as well as in 2021.

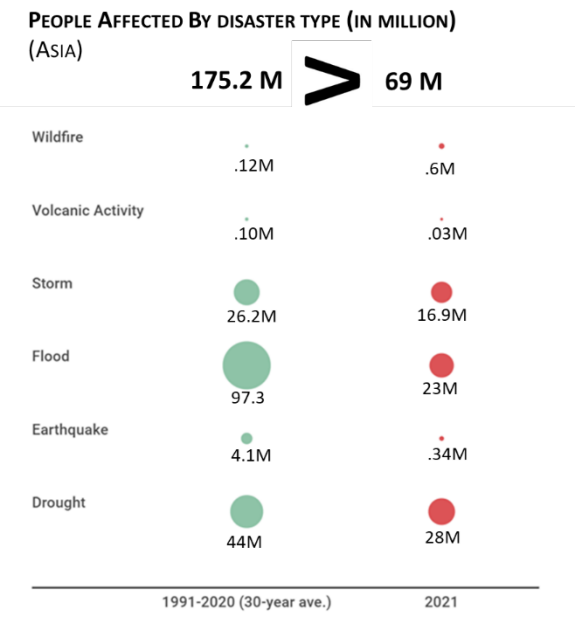

Figure 2.10 People affected by disaster in Asia (EM-DAT/CRED, 2022)

2.2.4 Economic Losses

Economic losses from disasters are lesser in 2021 compared with the annual average of economic losses in the last 30 years (Figure 2.11). The disaster types that incurred enormous economic damage in Asia are flood, earthquake, and storm. This data implies that flood has been consistently causing massive economic impact followed by storm and earthquake.

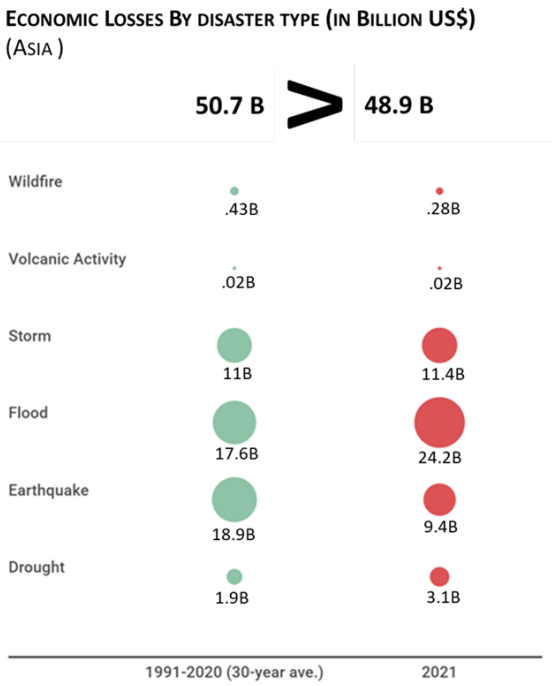

Figure 2.11 Economic losses from disasters in Asia (EM-DAT/CRED, 2022)

3. Climate Related Disasters

In this section, an overview of climate-related disasters (particularly those triggered by drought, extreme temperature, storm, flood, and wildfire events) will be highlighted. As a background, it is recognized that there are many factors contributing to climate change may be gleaned from the historical perspective since the industrial revolution (which led to economic growth, booming industries, and heightened development). Industrial revolution has environmental costs (e.g., 'The Anthropocene') that resulted in the earth's geological state, impacting the atmosphere and altered the hazard profiles that make it more frequent and severe. These environmental costs also contributed to the sudden and slow-onset hazards. Using the EM-DAT data, trends and impacts of climate-related disasters are analysed both at the global level and at the regional level (Asia).

3.1 Global trend in climate-related disasters

Data shows that there has been an increasing trend in climate-related disasters worldwide (Figure 3.1). On top of that, climate-related disasters are becoming more destructive. In 2021 alone, extreme cold waves and heat waves were recorded in many parts of the world. In April 2021, France was hit by extreme cold wave, and in June-July 2021, many parts of North America were hit by heat waves. British Columbia, Canada topped a stunning 49.6°C (121°F) on 29 June 2021. On the same day, Quillayute, Washington in the United States recorded an astonishing heat wave of 43.3°C (110°F).

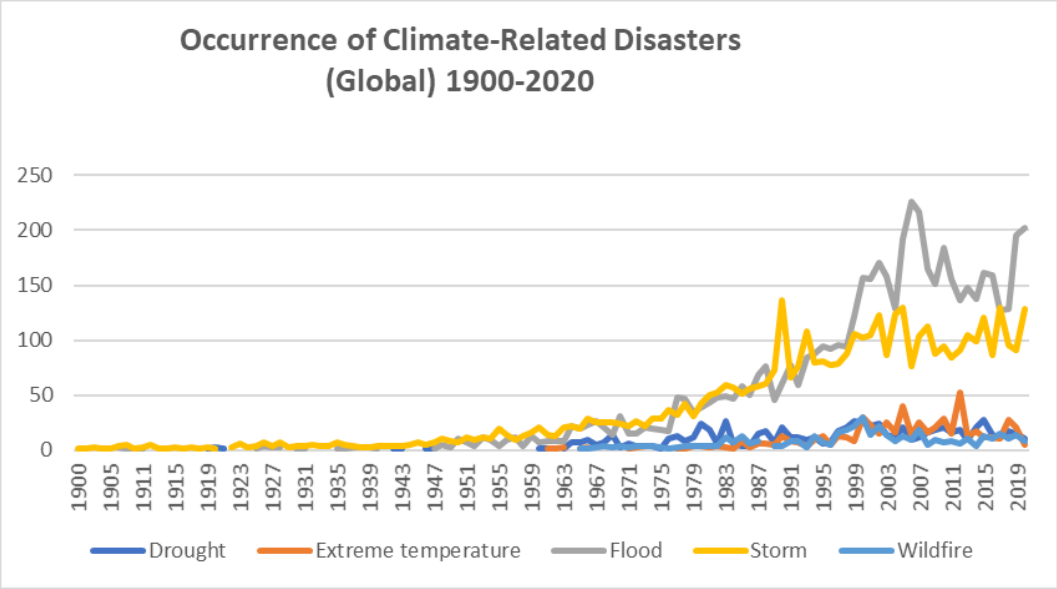

Figure 3.1 Global Occurrence of Climate-related disaster (EM-DAT/CRED, 2022)

Globally, climate-related disasters (particularly: flood, storm, and drought) account for the highest number of people affected as well as economic losses in 2021, a trend that continues since the last 30 years (Figure 3.2).

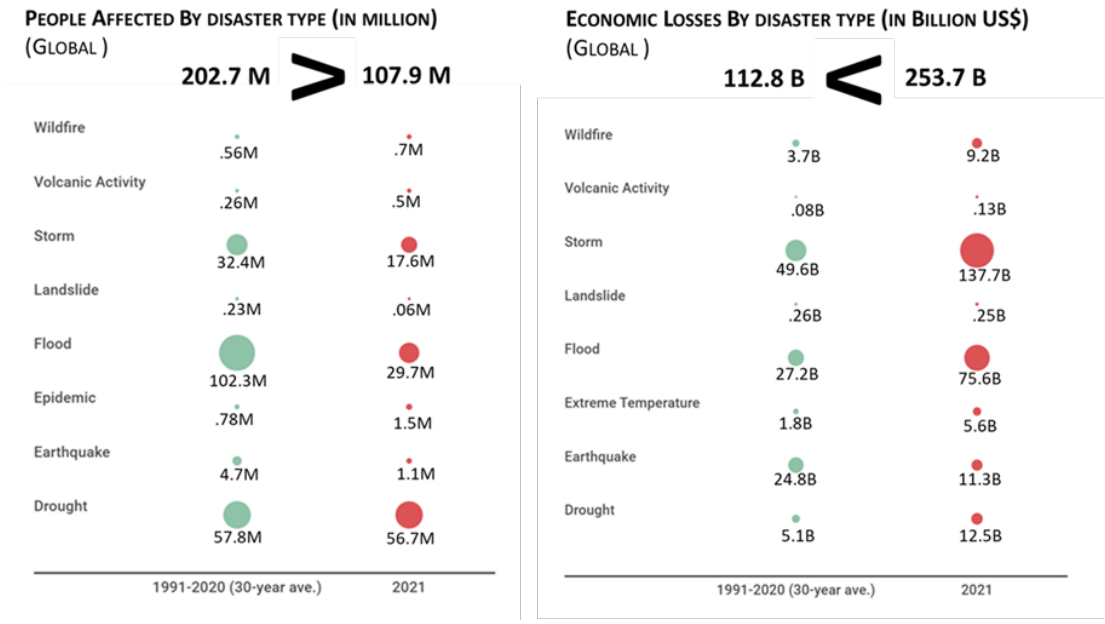

Figure 3.2 Impacts of climate-related disasters (EM-DAT/CRED, 2022)

3.2 Asian trend in climate-related disasters

In Asia, the trend of climate-related disasters mirrors the global trend with increasing occurrence of flood and storm (Figure 3.3). So, similarly in 2021, most Asian countries experienced an increasing trend of climate-related disasters. Aside from the heat wave, India was severely impacted by floods and cyclones affecting more than 18 million people. In Bangladesh and Nepal, millions of people were impacted by floods. In July 2021, about 14 million people in Henan Province, China and about 1 million people in Indonesia were impacted by floods.

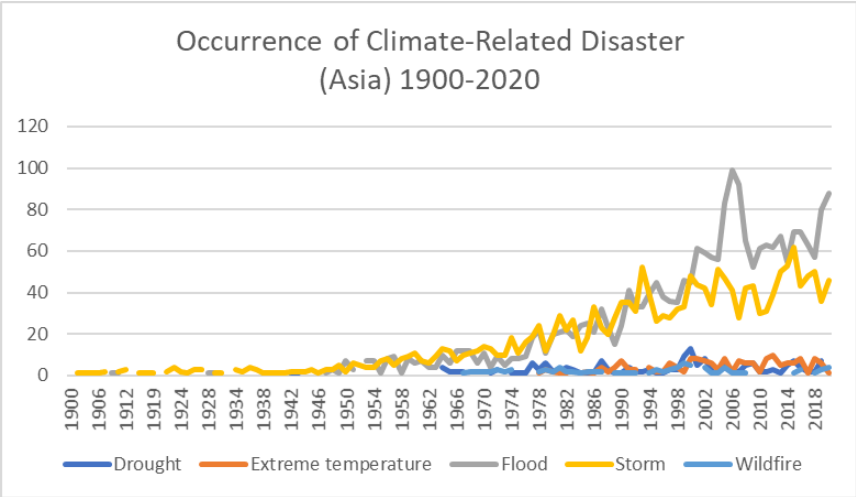

Figure 3.3 Occurrence of climate-related disasters in Asia (EM-DAT/CRED, 2022)

Drought has also been affecting millions of people during the past 30 years and in 2021 (Figure 3.4). Additionally, in 2021, drought incurred economic losses that unfolded slowly, but with devastating consequences affecting more than 28 million people.

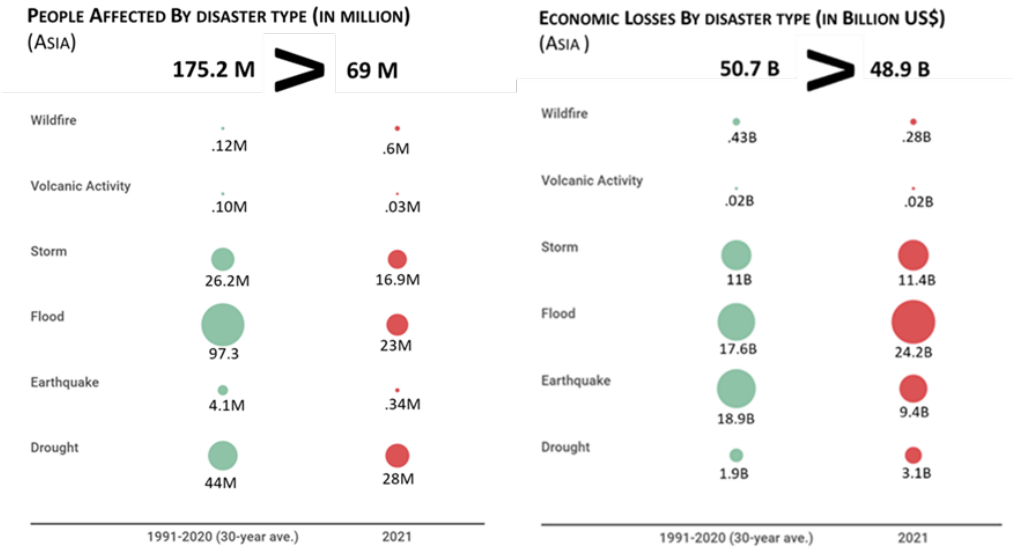

Figure 3.4 People affected and economic losses from disasters in Asia (EM-DAT/CRED, 2022)

4. COVID-19 Data

After two years of the COVID-19 pandemic, the virus continues to mutate and spread around the globe with no foreseeable end in sight. In this regard, this section presents an overview of the cumulative data of confirmed cases and deaths since 11 March 2020 when the World Health Organisation (WHO) declared the pandemic. Using the data retrieved from the *World Health Organisation COVID-19 Dashboard*, an overview of the COVID-19 situations at the global level and in ADRC member countries will be presented.

4.1 Global Situation

Since the beginning of the pandemic, there have been multiple virus cycles that led to an upward trend of confirmed cases (Figure 4.1). As the virus developed, it became more potent and less dangerous, thus showing more cases and lesser number of deaths. In addition, more individuals were vaccinated, thus reducing the worst impacts of the virus. The peak was in January 2022 when 23,201,079 cases were recorded in the winter at northern hemisphere.

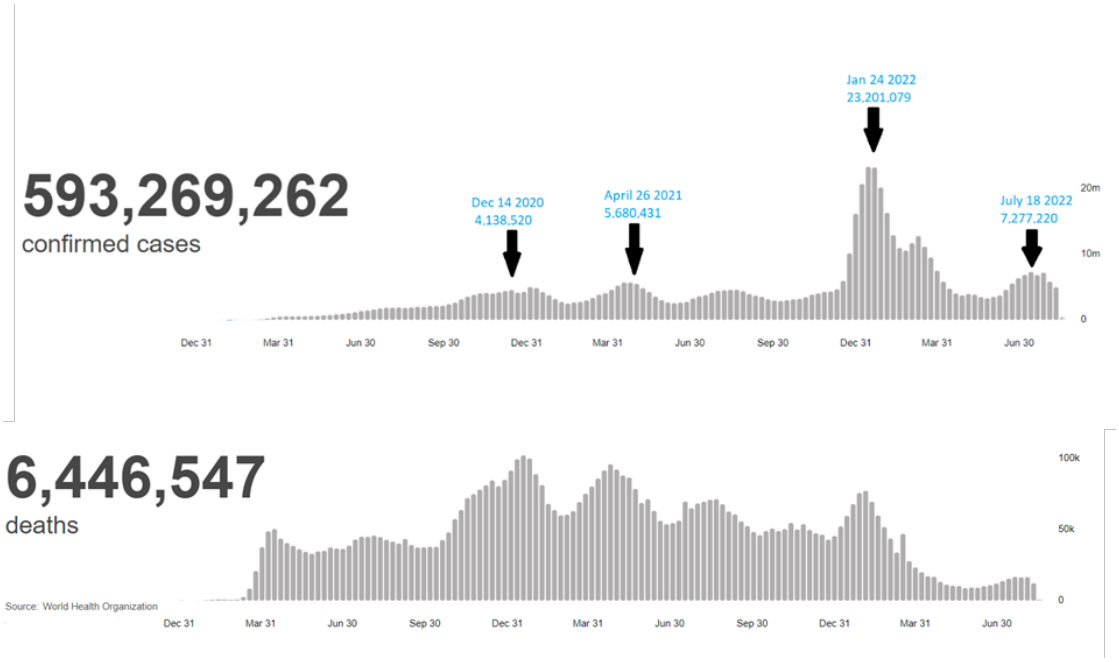

Figure 4.1 Global situation of COVID-19 as of July 2022 (WHO, 2022)

4.2 COVID-19 Situation in ADRC Member Countries

Among the ADRC member countries, India has recorded an extremely high number of accumulated infected cases giving the impression that other member countries have lesser cases (Figure 4.2)

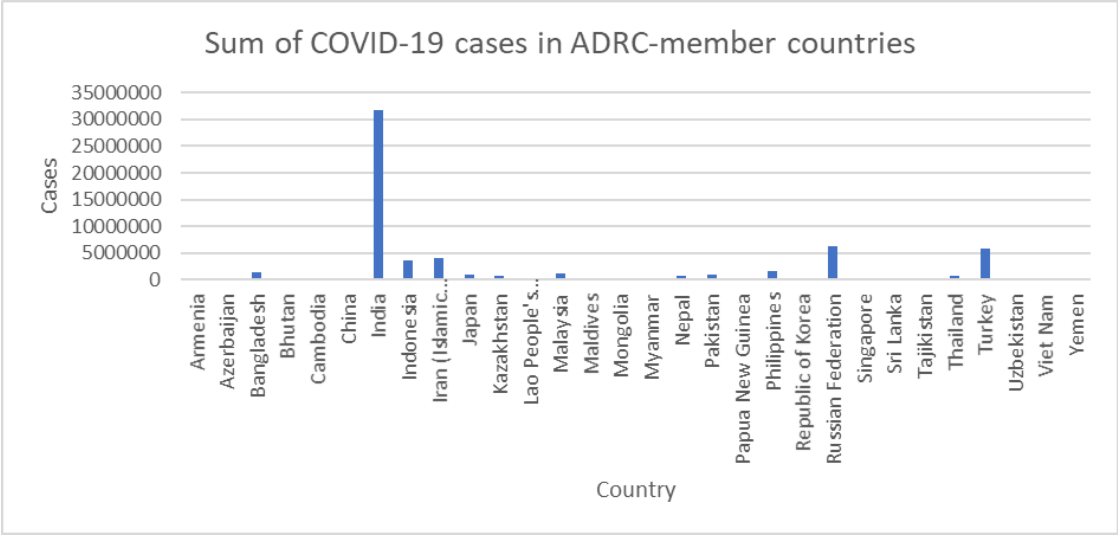

Figure 4.2 COVID-19 cases in ADRC member countries (WHO, 2022)

However, if India is taken out from the graph, a number of ADRC member countries have relatively high accumulated number of COVID-19 cases, including they Russian Federation, Turkey, Iran, Indonesia, and the Philippines (Figure 4.3).

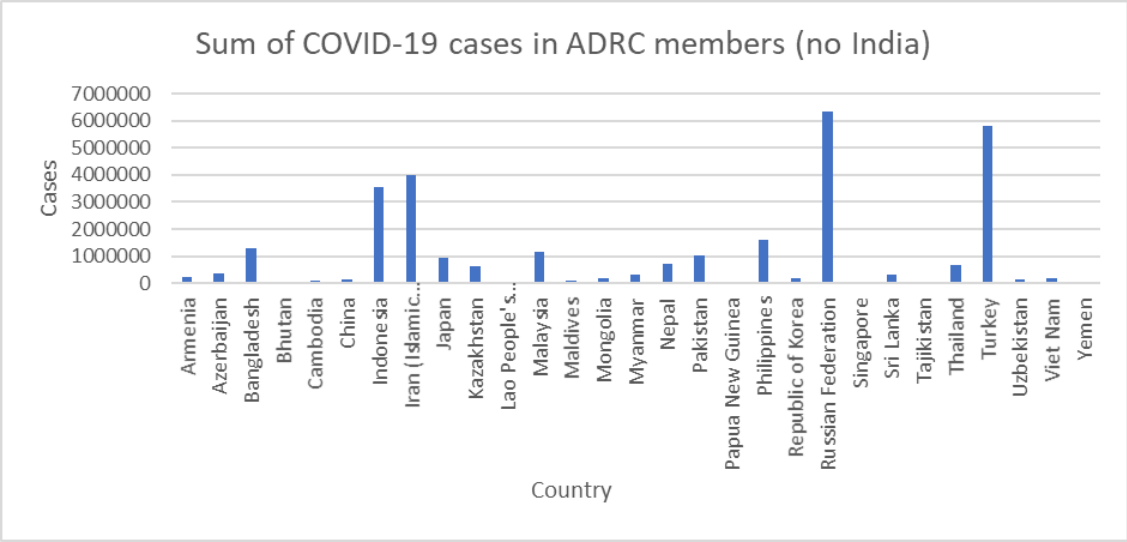

Figure 4.3 COVID-19 cases in ADRC member countries without India in the graph (WHO, 2022)

Essentially, internal policies for navigating the coronavirus situation differs with each ADRC member country. For example, strictness of COVID-19 countermeasures or harshness of penalties for breaking medical advice contribute in the spike or control of cases.

As of 7 July 2022, there has been in declining trend of deaths from COVID-19 in ADRC member countries compared to the time when the pandemic began. Factors contributing to the decline of the number of deaths could include vaccination, weaker virus strain, and improvement in medical system in handing COVID-19 cases. Among the ADRC countries that exhibited higher cumulative number of deaths from COVID-19 includes Armenia, Indonesia, Russian Federation, and Thailand (Figure 4.4).

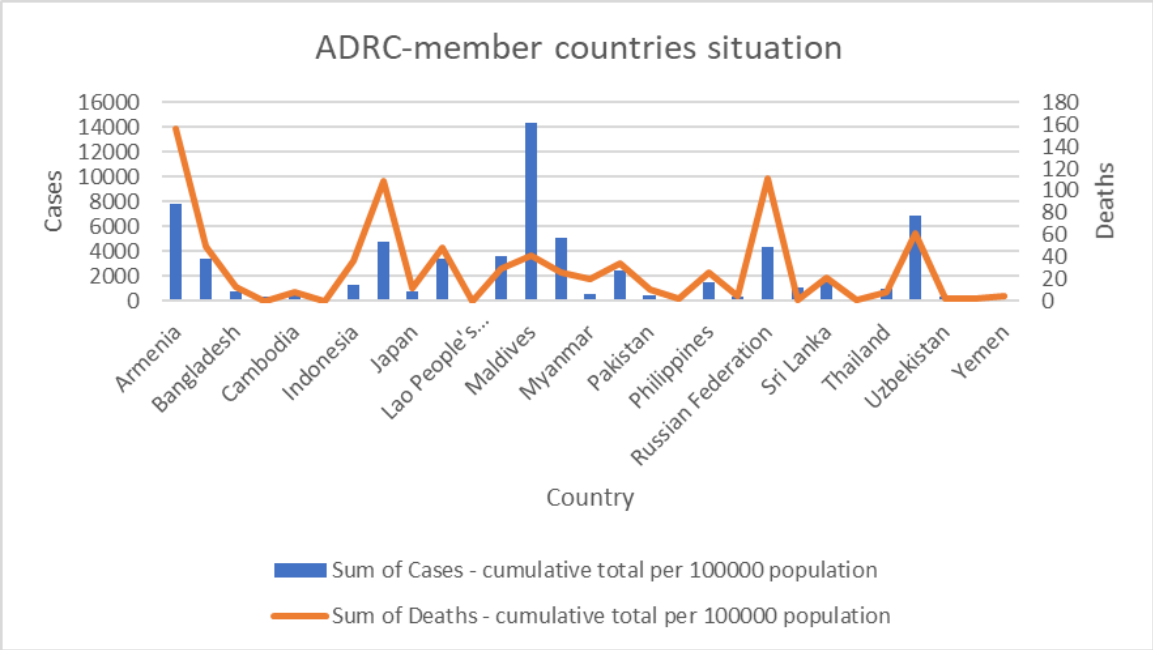

Figure 4.4 COVID-19 situation in ADRC member countries (WHO, 2022)

Notes on Sources of Data

Natural Disaster Data

All disaster data are based on EM-DAT: The Emergency Events Database - Université catholique de Louvain (UCL) - CRED, www.emdat.be, Brussels, Belgium. Data set was obtained on 7 July 2022, unless otherwise stated.

EM-DAT Criteria:

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:

- Ten (10) or more people reported killed
- Hundred (100) or more people reported affected
- Declaration of a state of emergency
- Call for international assistance

Databook 2021 follows the EM-DAT definitions of "people killed" as persons confirmed as dead and persons missing and presumed dead; "people affected" as the sum of injured, homeless, and affected requiring immediate assistance during the period of emergency and requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance.

Disaster Terms:

Drought includes an extended period of unusually low precipitation that produces a shortage of water for people, animals and plants.
Earthquake includes ground shaking and tsunami.
Epidemic includes bacterial and viral infectious diseases.
Extreme Temperature includes heat wave, cold wave, and extreme winter conditions.
Flood includes general flood, and flash flood.
Insect Infection is pervasive influx and development of insects or parasites affecting humans, animals, crops and materials.
Landslide includes avalanche, debris, and rockfall.
Storm includes local storm, tropical cyclone, and winter storm.
Volcanic activity means volcanic eruption.
Wildfire includes bush/brush fire, forest fire, and scrub/grassland fire.

Classification of EM-DAT:

EM-DAT distinguishes between two generic categories for disasters: **natural** and **technological**. The natural disaster category is divided into 5 sub-groups, which in turn cover 15 disaster types and more than 30 sub-types. The technological disaster category is divided into 3 sub-groups which in turn cover 15 disaster types, https://www.emdat.be/classification

COVID-19 Data

All COVID-19 data used in the Databook 2021 is based from the World Health Organization Coronavirus (COVID-19) Dashboard, https://covid19.who.int/ accessed on 7 July 2022.

Data from the WHO COVID-19 Dashboard are from the official reporting to WHO through regional offices and also from public websites, not official reported to WHO. Member States select the reporting system they prefer to use and data from different reporting systems. Individual countries, area and territories may decline to allow country-level disaggregation.

Some ADRC member-countries have no record of COVID-19 data in the WHO COVID-19 Dashboard.

Key Determinants for Data Analysis

In analysing the natural disaster data, ADRC is mindful of these four key determinants.

Population. It is clear that population affects the presentation of disaster profile of a country, region, or continent. EM-DAT's criteria for a disaster is when an event kills 10 or more people or affects 1,000 or more. If it is considered that a disaster occurs at the intersection of a natural hazard and a vulnerable population, a key facet of both of these parameters is the number of individuals exposed. Therefore, countries with larger populations would see a higher probability of disaster occurrence. Therefore, it would be logical for China and India to have the greatest weight on the parameters (e.g., total affected and total deaths), which the data supports.

Level of development. Countries that belong to the higher level of the development spectrum (usually correlated with GDP) accumulate capital and assets of higher value. This exposes them to heightened economic risk. Therefore, developed countries usually top the list when assessing total damages. The data supports this in such a way that the top three most damaging (USD value) disaster events to date were the Great Hanshin Awaji Earthquake of 1995, Hurricane Katrina of 2005, and the Great East Japan Earthquake of 2011.

Socio-political condition. Another EM-DAT criterion for a disaster is when the government declares a state of emergency and calls for international assistance. However, since there are different bases and thresholds for national governments to declare state of emergency and call for international assistance, it is likely that the socio-political condition comes into play. Therefore, it possible that the inclusion of some events is dependent on value judgements in a given socio-political condition.

Statistical timestamp bias. In this Databook, disaster data of 2021 is compared with the annual average of disaster data from 1990-2020. While valuable conclusions may be made from the 2021 disaster data, it is susceptible to disproportionate representation of individual events. On the other hand, the average data of 1990-2020 is susceptible to under-representation of disaster events.

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