

TETRIS PROGRAM

Disasters in Indonesia

Analysis of the regional (province) distribution of natural and technological disasters, 2000-2023

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#StackYourSkill



Step 1 - Data Collection & Data Integration

Survey

Conduct **survey** by category. Then selected the category on humanity

Explore

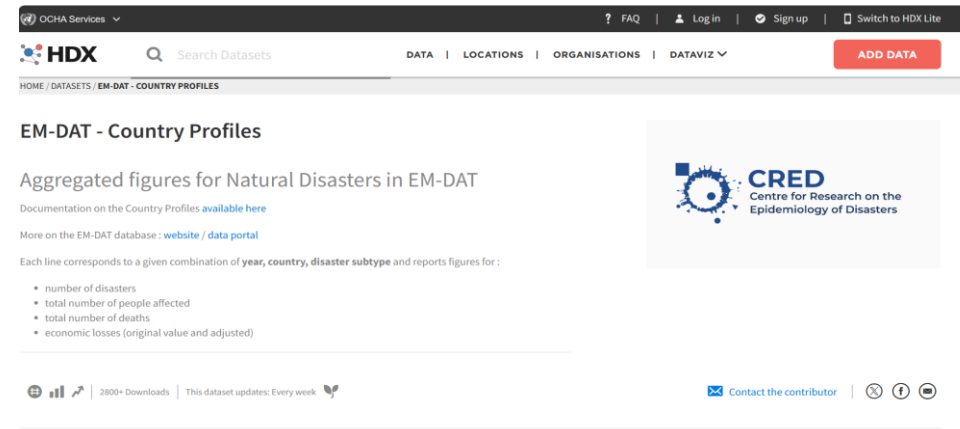
Explore humanitarian data on HDX (Humanitarian Data Exchange)

Find

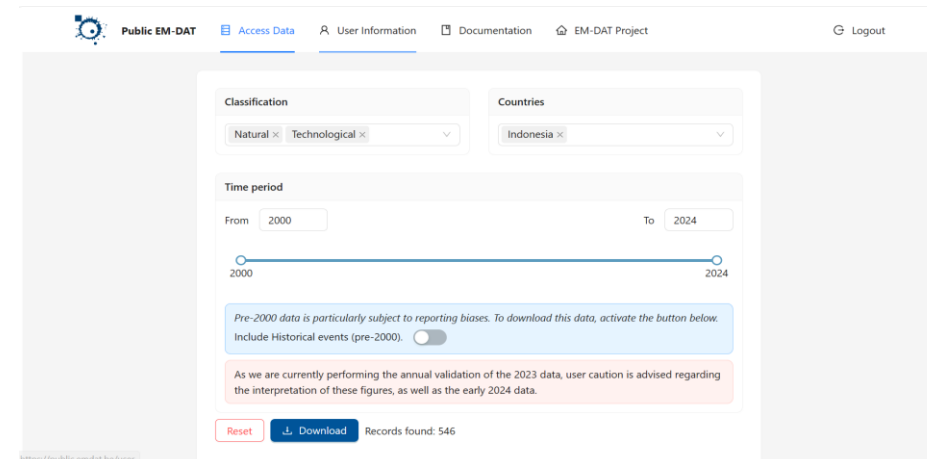
Find disaster data and trace the source of the data

Access

Accessing data from the EM-DAT source, then selecting Indonesia with the classification of natural and technological disasters.



Source: [EM-DAT - Country Profiles - Humanitarian Data Exchange \(humdata.org\)](https://hdx.org/en/datasets/em-dat-country-profiles/)



Source: [Public EM-DAT platform \(emdat.be\)](https://emdat.be/)



Step 2 - Data Cleansing

Part 1

	Z	AA	AB	AC	AD
	Total Deaths	No. Injured	No. Affected	No. Homeless	Total Affected
5	13	22			
3	13				
24	34				
6	26	31			
	10		1516		
4	45	270		52500	
24	126		50000		
7	41				
4	103	2714	200000	2000	
	15		203		
28	32				
20	10	3			
12		124		4000	
24				520	
13	10	30			
11	16	66			
1	40		50000	2125	

There are **missing values** in total death and total affected

Possible Cause:

1. No access to the number of victims affected
2. Indeed, no victims died or were affected

Addressing the situation:

Fill in the blank data with the KNN method

AI	AJ
Total Damage ('000 US\$)	Total Damage, Adjusted ('000 US\$)
11600	19714
30000	50985
79000	134261
41000	69680
2000	3399

There are **missing values** in **Total Damage** and **Total Damage, Adjusted**

Addressing the situation:

Since the data is about the range of disaster impact losses, and every year there are economic fluctuations, we filled the data with a value of 0

Possible Cause:

1. Disasters with technological classification do not include total damage and total damage, adjusted
2. Not getting access to information or data on total damage and total damage, adjusted from Indonesia

TETRIS PROGRAM



Step 2 - Data Cleansing

Part 2

Location	
Woosobo (Java)	
Java	
Brebes district (Jawa Tengah province)	
Java Isl.	
Jakarta	
Riau province (Sumatra Isl.), Kalimantan Barat, Kalimantan Tengah provinces (Borneo Isl.)	
Totikum, Tinangkung, Liang villages (Banggai Kepulauan district, Sulawesi Tengah province), Banggai district (Sulawesi Tengah province)	
Malaka Tengah, Malaka Barat areas (Belu district, Nusatenggara Timur province)	
Ambon Island	
Enggano island (Bengkulu Utara district, Bengkulu province)	
Ngada district (Flores Isl.)	
Padang Panjang, Sumatera Barat	
Dukuh Karak (Cilacap district, Jawa Isl.)	
Ciranggon village (Karawang district, Jawa Barat province)	
Banggai city (Banggai Kepulauan district, Sulawesi Tengah province)	
Jakarta	
Near Katanggan village (Java Isl.)	
Cilacap, Banyumas districts (Jawa Tengah province)	

The data format in the location variable column is **still too random**

Addressing the situation:

In order to simplify the analysis of the distribution of disaster areas, we standardize the location variables by province

	B	C	D	E	F	G	H	I	J	K	L
1	Year	Month	Disaster Group	Disaster Subgroup	Disaster Type	Disaster Subtype	Total Deat	Total Affect	Total Damage ('000 US	Total Damage, Adjusted ('000 US	Location
2	2000	Januari	Technological	Transport	Road	Road	13	22	0		0 Jawa Tengah
3	2000	Januari	Technological	Transport	Road	Road	13	333	0		0 Jawa Tengah
4	2000	Februari	Natural	Hydrological	Mass movement (wet)	Mudslide	34	84377	11600		19714 Jawa Tengah
5	2000	Maret	Technological	Transport	Road	Road	26	31	0		0 Jawa Tengah
6	2000	Januari	Natural	Biological	Epidemic	Viral disease	10	1516	0		0 Jakarta
7	2000	Februari	Natural	Climatological	Wildfire	Forest fire	585	511572	0		0 Riau
8	2000	Februari	Natural	Climatological	Wildfire	Forest fire	585	511572	0		0 Kalimantan Barat
9	2000	Februari	Natural	Climatological	Wildfire	Forest fire	585	511572	0		0 Kalimantan Tengah
10	2000	Mei	Natural	Geophysical	Earthquake	Ground movement	45	52770	30000		50985 Sulawesi Tengah
11	2000	Mei	Natural	Hydrological	Flood	Flash flood	126	50000	79000		134261 Nusa Tenggara Timur
12	2000	Mei	Technological	Transport	Water	Water	41	12005	0		0 Maluku
13	2000	Juni	Natural	Geophysical	Earthquake	Ground movement	103	204714	41000		69680 Bengkulu
14	2000	Mei	Natural	Biological	Epidemic	Viral disease	15	203	0		0 Nusa Tenggara Timur
15	2000	Juni	Technological	Transport	Rail	Rail	32	24750	0		0 Sumatera Barat
16	2000	Juli	Technological	Transport	Road	Road	10	3	0		0 Jawa Tengah
17	2000	Juli	Natural	Geophysical	Earthquake	Ground movement	25	4124	2000		3399 Jawa Barat

The following data is already in a clean state

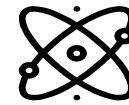
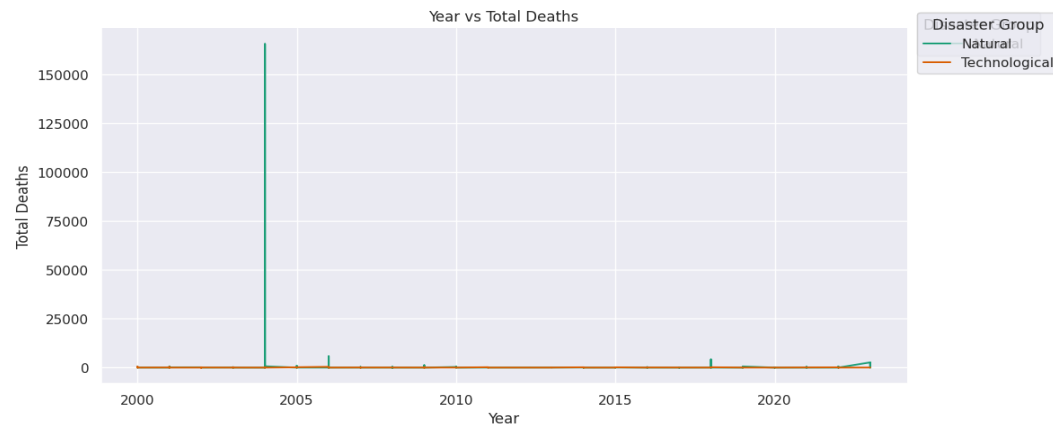
Then the data is ready to be explored in SQL and Python

Step 3 - Data Exploration & Data Visualisation

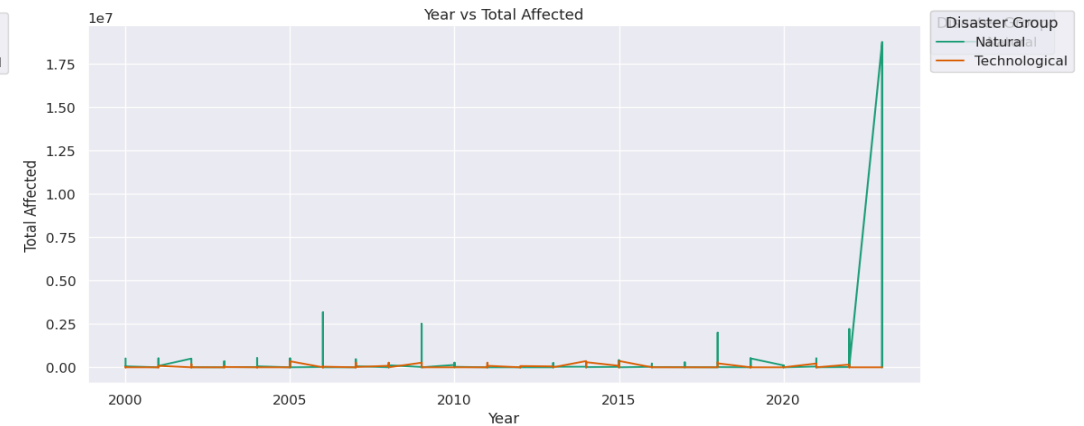
What is the impact of natural and technological disasters from year to year ?



Disaster Group	jumlah_bencana
Technological	170
Natural	672



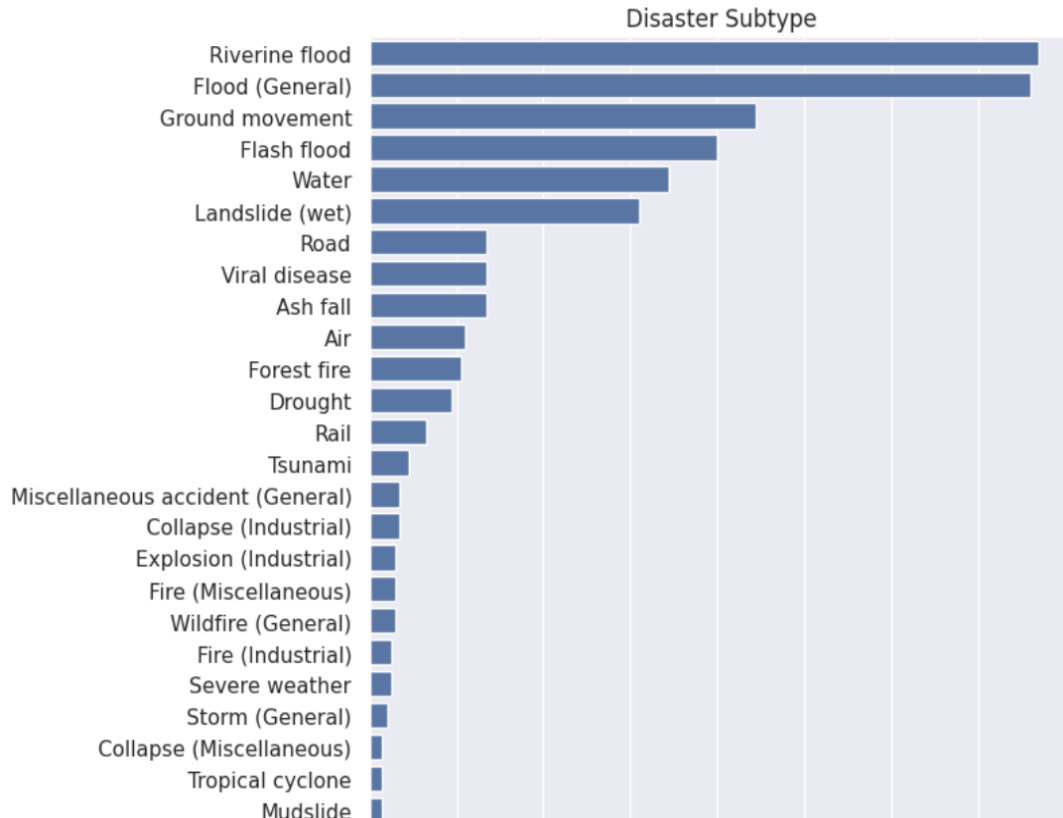
jumlah_tewas	jumlah_terdampak
442,002	387,498,281



1. The data show that the consequences of natural and technological disasters in the period 2000- 2023 have **caused many deaths and injuries**.
2. The number of victims of **natural disasters appears to be higher** each year than the number of victims of **technological disasters**, because the frequency of **natural disasters is higher** and **more difficult to predict**.

Step 3 - Data Exploration & Data Visualisation

Which disaster has the most impact on casualties ?



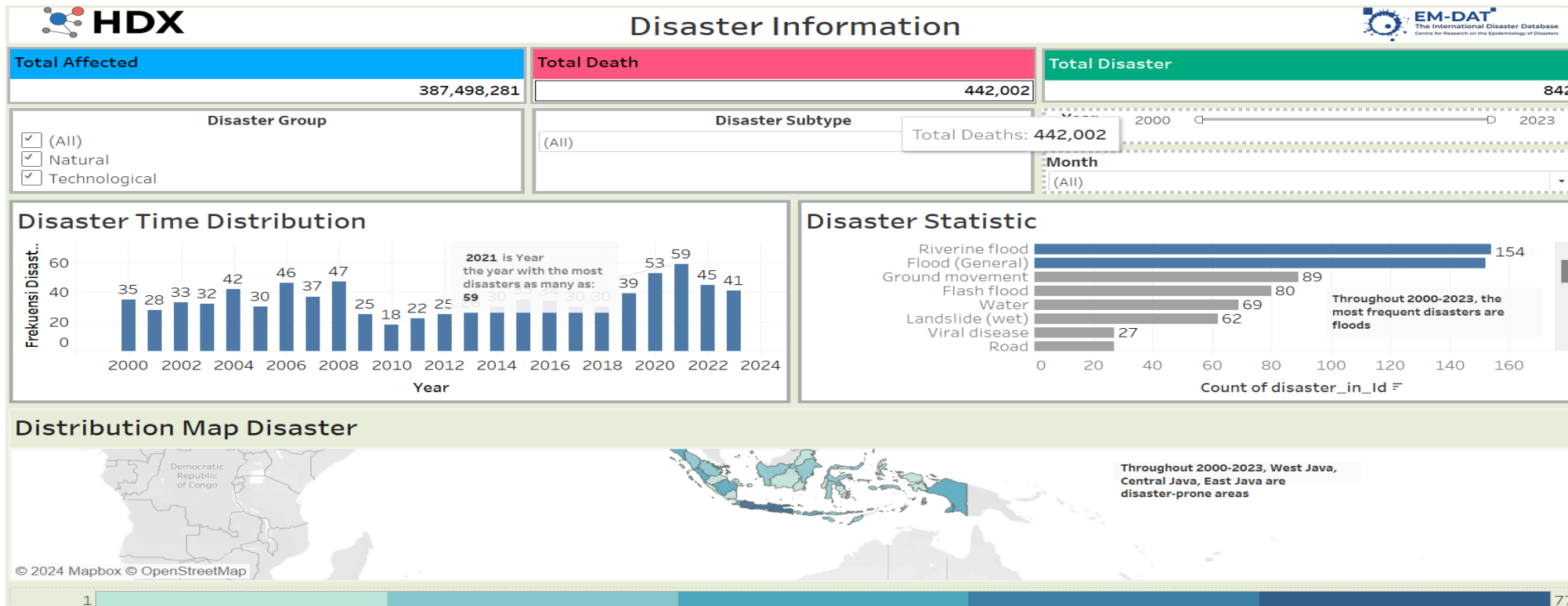
	ABC Disaster Subtype	123 jumlah_tewas	123 jumlah_terdampak	123 total_kerusakan_usd
1	Tsunami	337,702	3,159,125	15,644,179
2	Drought	45,329	318,799,817	1,591
3	Ground movement	19,142	19,190,320	20,721,350
4	Viral disease	7,187	623,499	0
5	Riverine flood	5,024	13,168,252	15,336,709
6	Forest fire	4,369	6,040,588	7,510,072
7	Flash flood	4,261	6,107,567	7,461,960
8	Flood (General)	4,229	7,050,814	589,751

1. From the data exploration, it can be seen that the **most frequent disaster is flooding** throughout 2000-2023.
2. However, the disaster that caused the most impact during 2000-2023 was **the tsunami** with the **highest total deaths and material losses**.

Step 3 - Data Exploration & Data Visualisation

Disasters in Indonesia

< Disaster Information Quick Chats Disaster >

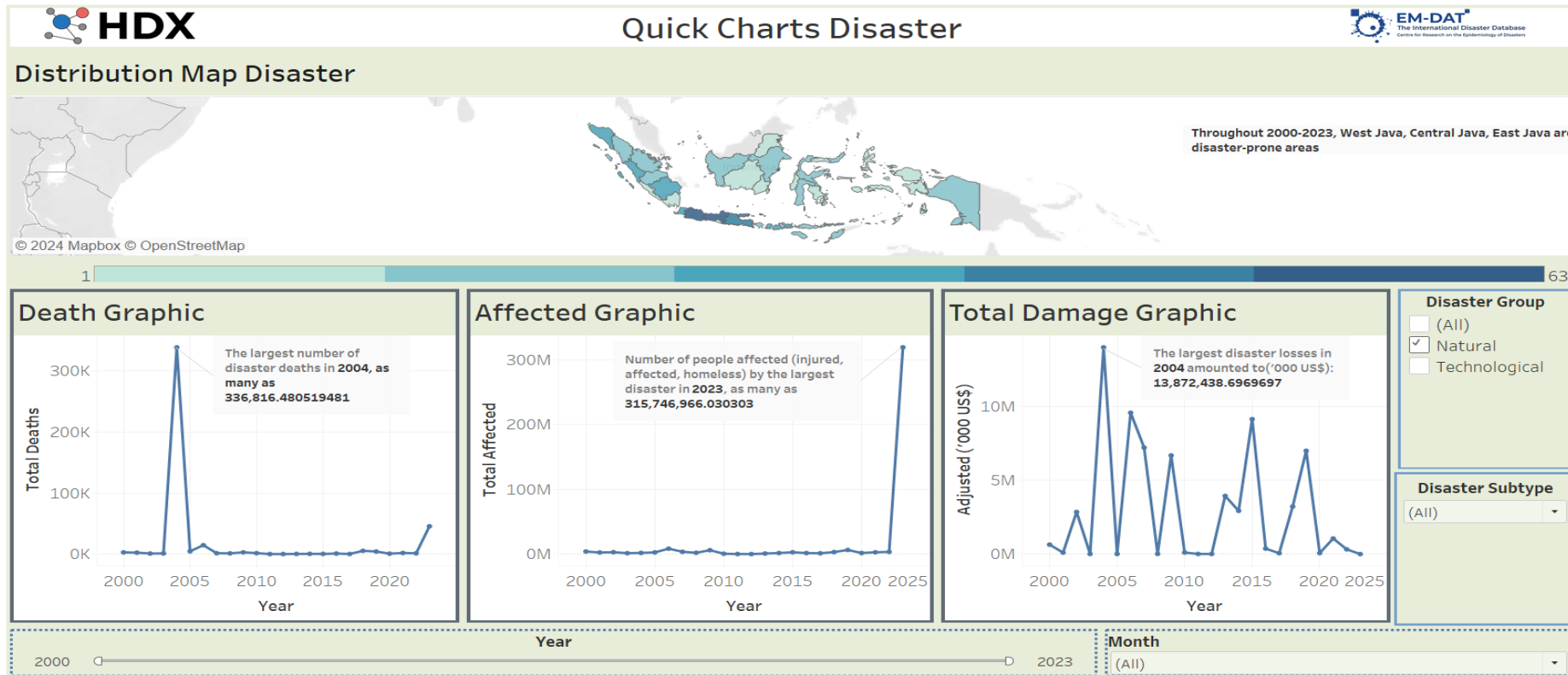


Summary: Of all the disasters that occurred throughout 2000-2023, the greatest frequency of disasters in 2021, then the region with the greatest frequency of disasters is **Java Island**

Step 3 - Data Exploration & Data Visualisation

Disasters in Indonesia

< Disaster Information Quick Chats Disaster >



Summary: The largest total deaths and losses occurred in 2004 in December due to the tsunami in Aceh Province, then the largest total impact in 2023 due to strong winds that hit almost all parts of Indonesia.



Step 4 - Insight Analysis

Summary Insight	<ol style="list-style-type: none">1. The impact of natural and technological disasters in the period 2000–2023 has caused many deaths and injuries, but the number of victims of natural disasters is higher every year, because the frequency of natural disasters is higher and more difficult to predict.2. Then the most frequent disaster was flooding, but the disaster that caused the most impact was the tsunami with the highest total casualties and material losses.3. Of all the disasters that occurred throughout 2000–2023, the largest disaster frequency was in 2021, then the region with the largest disaster frequency was Java Island. In addition, the largest total casualties and losses occurred in 2004 in December due to the tsunami in Aceh Province, then the largest total impact in 2023 due to strong winds that hit almost all parts of Indonesia.
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Feedback	<p>Reconfirm the data with the relevant official institutions, so that the accuracy of the data is better maintained.</p> <p>Then it is important to update the data, so that the implementation of policies is more measurable based on the latest phenomena.</p>
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Suggestions for related institutions

→ In accordance with the insights gained, improving natural disaster mitigation as a preventive measure such as providing safety insights in the event of a disaster

→ In addition, Equalization of disaster preparedness across Indonesia, such as monitoring with support tools, management of areas away from disaster sites, and disaster-resilient infrastructure.

→ Stricter implementation of safety training and education, regular inspections, and monitoring and evaluation by relevant agencies to minimise the number of industrial accidents.

→ Strengthening regulations and law enforcement related to transport safety standards, then improving infrastructure and routine maintenance, as well as campaigning for public awareness of transport safety.

DΦLab

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dan Persiapkan Diri Menjadi Praktisi Data!

