

# Climate Change and Environmental Disasters

## Team: ClimateTech

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## Objective of the Study:

Indonesia's tropical climate is characterized by a wet and dry season and is increasingly affected by climate change due to rising temperatures, unpredictable rainfall, and sea level rise. These changes result in more frequent and severe environmental disasters including floods, landslides, droughts, earthquakes, sea level rise and heatwaves.

Our project aims to identify disaster-prone regions in Indonesia and analyze the impacts of climate change through meta-analysis. By developing an interactive website we will visualize climate change effects, disaster frequency, socio-economic impacts and provide actionable policy recommendations to mitigate these challenges.

## Data and Methods:

### Data Sources:

In our project, we utilize a combination of data collection techniques and data processing methods to acquire, integrate, and analyze data from the following key sources:

[IMF Climate Change Indicators Dashboard](#) and [Our World in Data - Climate Change](#):

This source provides extensive global climate data, including information on temperature fluctuations, greenhouse gas emissions and rainfall variations which are essential for tracking climate change trends in the Indonesia region.

[World Bank Climate Knowledge Portal](#):

This is a repository of climate data specific to countries. This portal provides historical and projected climate patterns helping us to understand Indonesia's vulnerability to climate changes.

#### [Our World in Data – Natural Disasters](#) :

This source offers data on global natural disasters, including occurrences and their impact on human populations which can be used for correlating disaster trends with changing climate patterns in Indonesia.

### **Methods and Tools:**

The following tools and methods will be employed throughout the project to ensure efficient data processing, analysis, and presentation:

- **Python/Pandas:**  
Used for data cleaning, processing, and manipulation to clean and structure the data from the datasets for analysis.
- **Matplotlib:**  
To create interactive visualizations, charts, and graphs that allow for dynamic exploration of climate and disaster data.
- **Correlation and Regression Analysis:**  
Applied to establish relationships between climate variables (e.g., temperature, rainfall) and the frequency or severity of disasters such as floods and heatwaves.
- **React JS:**  
A modern JavaScript library used to build the interactive front-end of the website. It will handle the user interface for data visualizations.
- **Tailwind CSS:**

A utility-first CSS framework for designing a responsive and visually appealing interface, ensuring seamless access across different devices and screen sizes.

- Express JS & Node.js:

Employed for back-end development, handling API requests and managing communication between the front-end and the backend server to retrieve and process data efficiently.

## **Expected Outcomes and Deliverables:**

- Meta-Analysis Report and Correlation Analysis:

- A report summarizing existing literature and datasets on climate change in Indonesia. Details about changes in temperature, precipitation and the increasing frequency and intensity of environmental disasters.
- Insights on socio-economic impacts highlighting how climate change disproportionately affects vulnerable populations, agriculture, urban areas, and coastal regions.
- Correlation analysis quantifying the relationship between climate factors and the occurrence of natural disasters identifies key reasons behind disaster risk in specific regions of Indonesia.

- Data Visualizations:

- Interactive visualizations showcasing climate trends, risk maps and socio-economic impacts.
- Visual tools displaying correlations between climate changes and disaster occurrences in high-risk areas and populations.

- Interactive Website:

- The interactive website for visualizing the impact of climate change and its associated disasters in Indonesia. It will feature analysis of climate change and

environmental disasters, dynamic heat-maps and graphs to explore climate trends, disaster frequency and its socio-economic impacts

- Resilience and Mitigation Recommendations:
  - A set of actionable strategies and targeted policy recommendations to reduce the impact of climate change and frequent occurrences of environmental disasters aimed at improving adaptive capacity and sustainable development in response to climate change.