GLOBALBLAZE: ANALYZING GLOBAL TRENDS IN WILDFIRE BURNED AREAS AND EMISSIONS (2002-2023)

PUNEETHA DHARMAPURA SHRIRAMA

AGENDA

1. Introduction
2. Data Sources
3. Data Pipeline
4. Results
5. Conclusion
6. Limitations

Introduction

- Wildfires are a major environmental challenge.
- Influence on climate change and air quality.

Objectives:

- Analyzing long-term trends.
- Examining seasonal variations.
- Identifying regions with the most wildfires.
- Correlation between wildfire area burned and emissions.

Data Sources

Global Wildfire Information System (GWIS) [2002-2023]

- Global Monthly Burned Area Dataset (GMBAD) :

  This Dataset contains details about monthly burned area records for different countries and landtypes. Land types are measured in hectares.

- Global Monthly Emission Dataset (GMED) :

  It Contains monthly burning emissions by different pollutants and countries. Pollutant gases are measured in tons.

Data source : Global Wildfire Information System (https://gwis.jrc.ec.europa.eu/apps/country.profile/downloads)

Data Pipeline

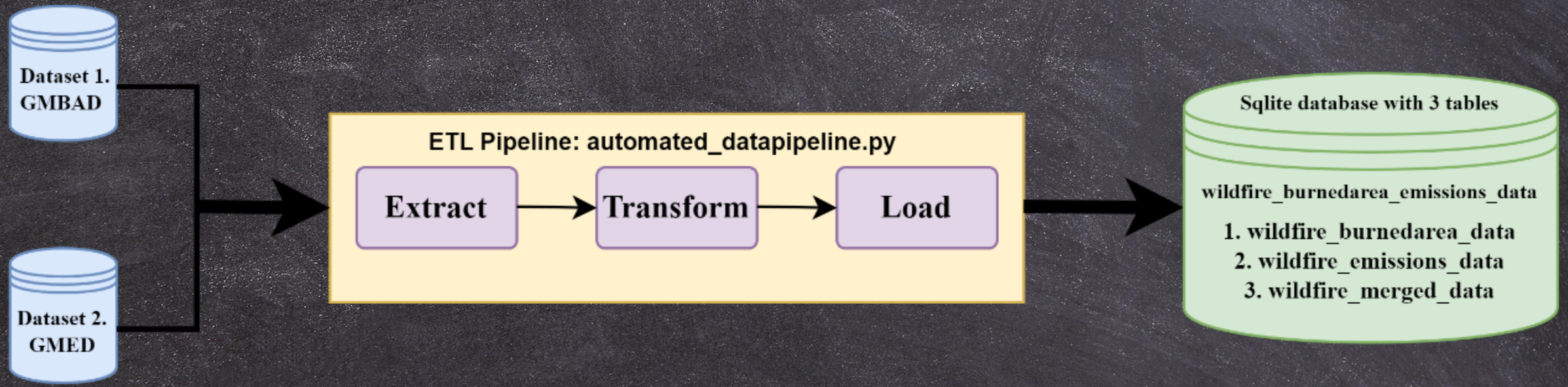

Figure 1 : ETL Pipeline Flowchart

Results

1 .Long-term Trends

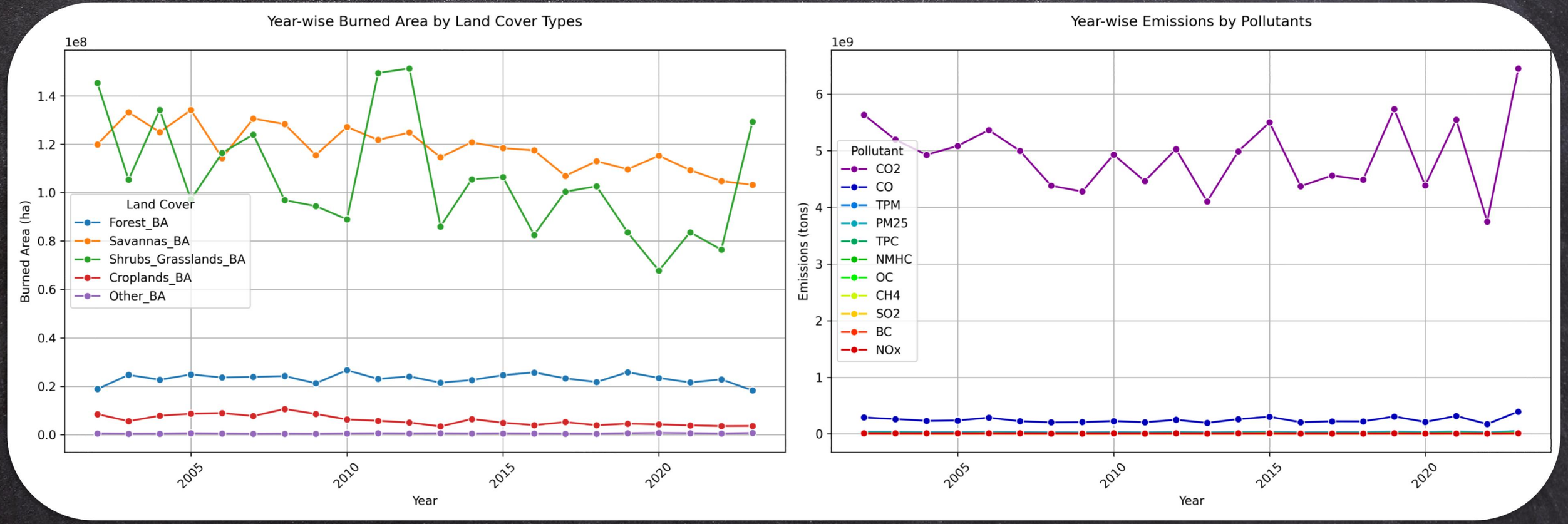

Figure 2 : Year-Wise Burned Area and Emissions

Insights:

- Stable wildfire patterns in forests due to effective fire management.
- High burned areas are shrubs, grasslands, and savannas.
- Slight decline over time due to improved land care and climate change.
- CO2 emissions show fluctuations with notable peaks and troughs.

2. Seasonal Variations

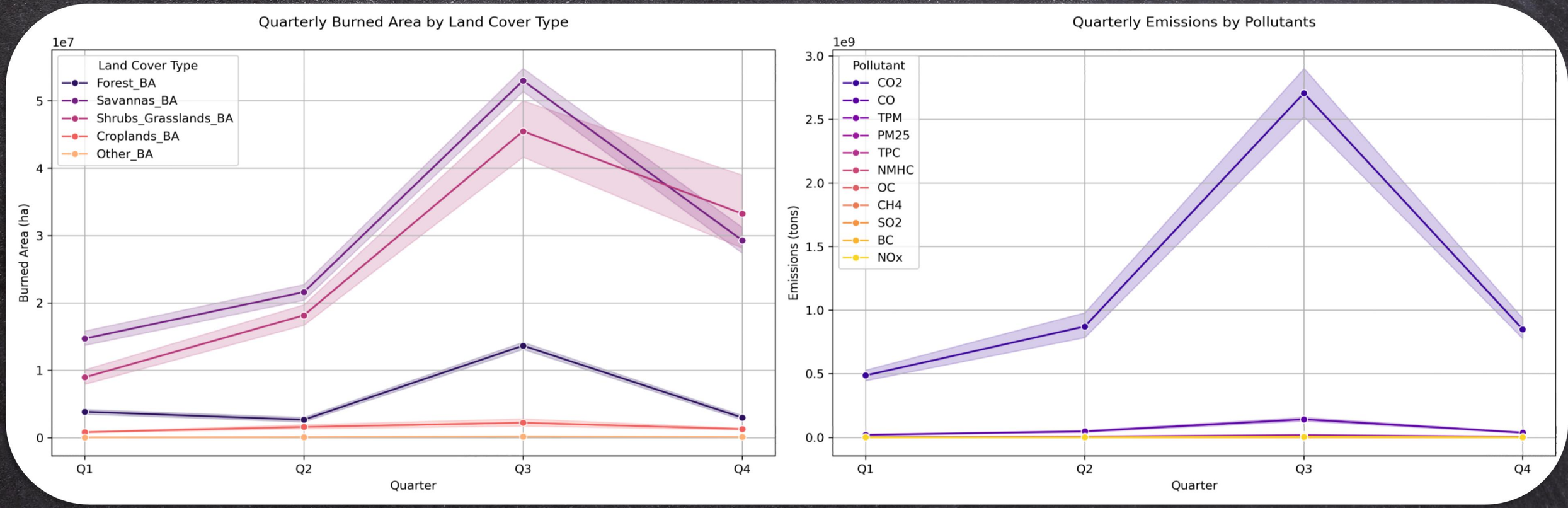

Figure 3 : Quarterly Burned Area and Emissions

Insights:

- Burned area and emissions increase from Q1 to Q3, peaking in Q3 (July to September).
- High temperatures and low humidity in summer.
- Human Activities
- Noticeable decrease in Q4 due to late autumn to early winter.

3. Top Countries Affected by Wildfires

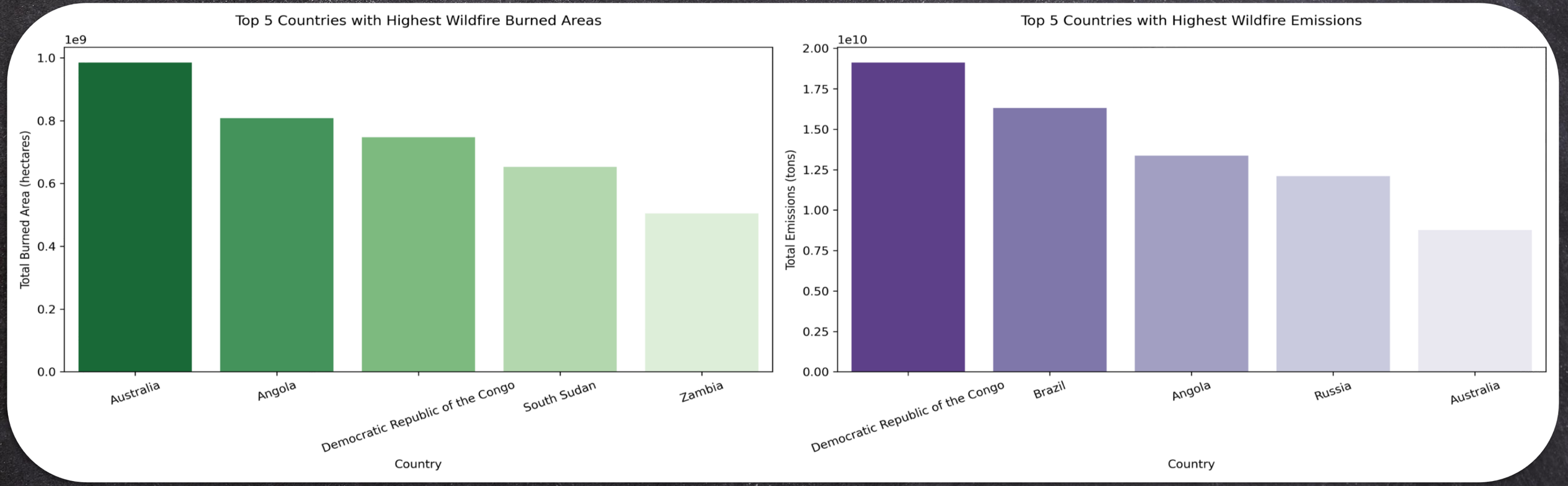

Figure 4 : Top Countries affected by Wildfires

Insights:

- Australia: Dry Climate and drought conditions.
- Angola, Democratic Republic of the Congo, South Sudan, Zambia : Extensive savannas and grasslands.
- Brazil has amazon rainforest
- Russia has Siberian and boreal forests contains large amount of carbon-rich peat and organic soils.

4. Correlation between Burned Area and Emissions

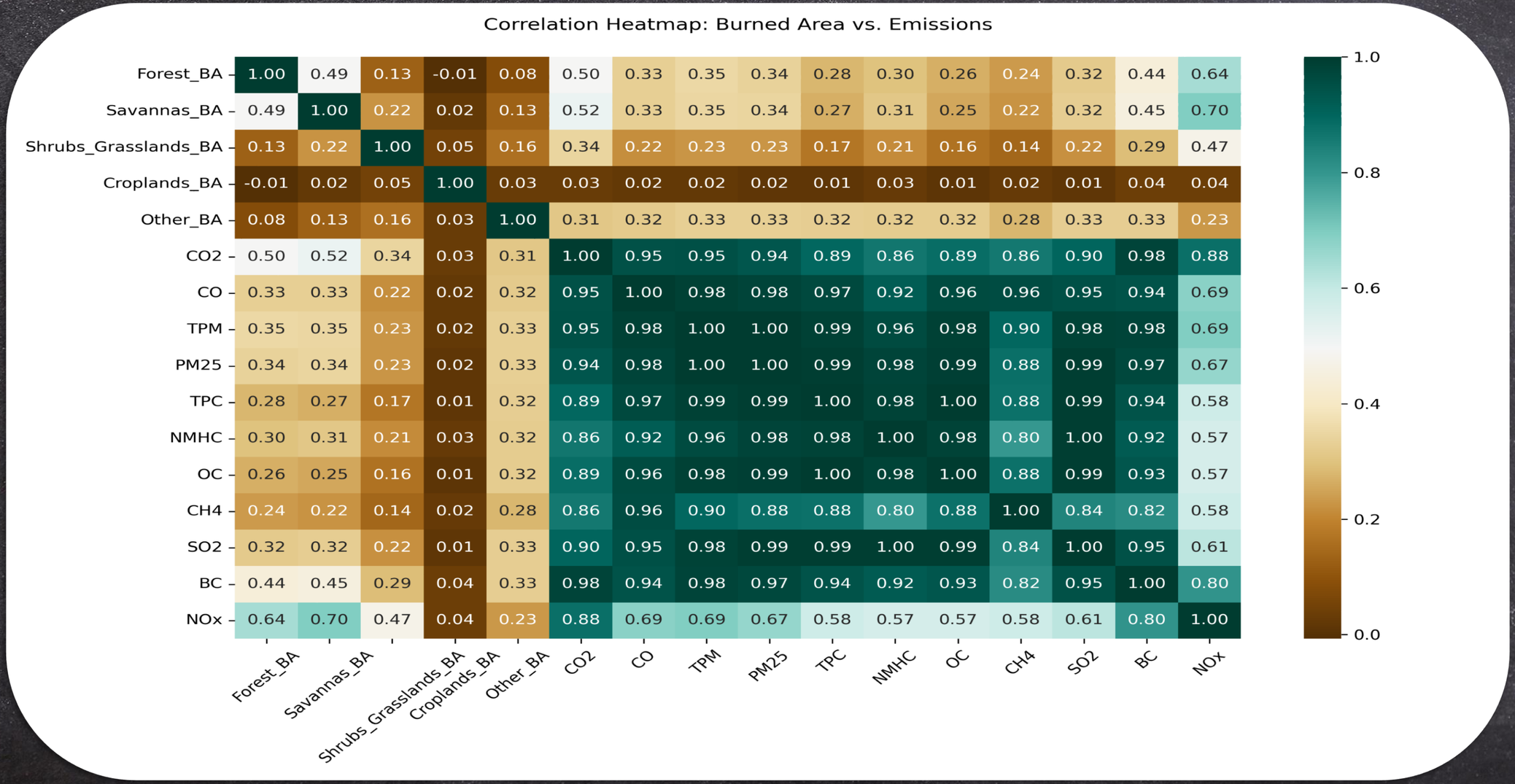

Figure 5 : Correlation between Burned Area and Emissions

Insights:

- Emissions are highly correlated with each other.
- Reducing one type of emission helps to decrease others.
- Forests and savannas are significant contributors to CO2, CO, TPM, and NOx emissions.
- Croplands have the least impact on emissions.

Conclusion

To Conclude..

Savannas and shrub grasslands are more prone to wildfires.

Wildfires are peak in summer months (July to September).

Strong correlation between burned area and emission gases, particularly CO2 and NOx.

Effective fire management practices and targeted emission reduction strategies are crucial.

Limitations

Limitations for Datasets

1. Does not fully explore all factors contributing to wildfires.

2. Monthly data aggregation may overlook detailed temporal variations.

THANK YOU ☺

Puneetha Dharmapura Shrirama

https://github.com/puni-ram48/MADE-SS2024