Global Greenhouse Gas (GHG) Emissions Report

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Introduction

The report presents an analysis of greenhouse gas (GHG) emissions data from the Emissions Database for Global Atmospheric Research (EDGAR) [1]. Data cover all countries from 1970 to 2023.

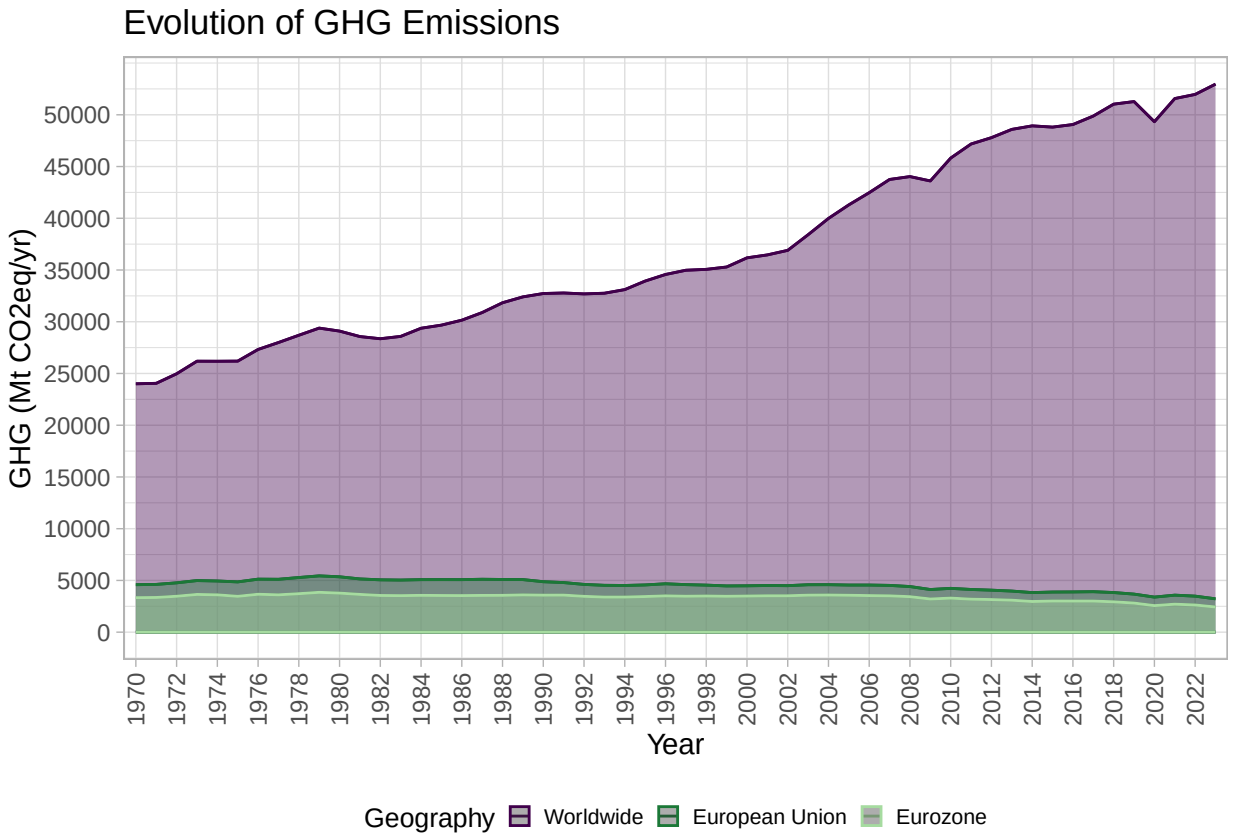
Data were analyzed and visualized using R, mainly with the tidyverse packages (e.g., dplyr, ggplot2). The report was generated using Rmarkdown, and Git and GitHub were used as version control system (link to GitHub repository).

Evolution of GHG emission growth

What is the evolution of GHG growth in the Euro area, in the European Union, and worldwide?

For this analysis, data from the Excel sheet 'GHG_totals_by_country' were used. The pre-existing GLOBAL TOTAL and EU27 rows were used, while new rows for Eurozone were computed aggregating data from the relevant countries.

- From 1970 to 2023, worldwide GHG emissions increased from approximately 24000 Mt CO2eq/yr in 1970 to about 52000 Mt CO2eq/yr in 2023.
- Throughout this period, the European Union consistently contributed around 5,000 Mt CO2eq/yr until 1990. After that, emissions in the European Union began to decline, with a more significant drop following 2008.
- The Eurozone followed a similar declining trend to the European Union after 2008.

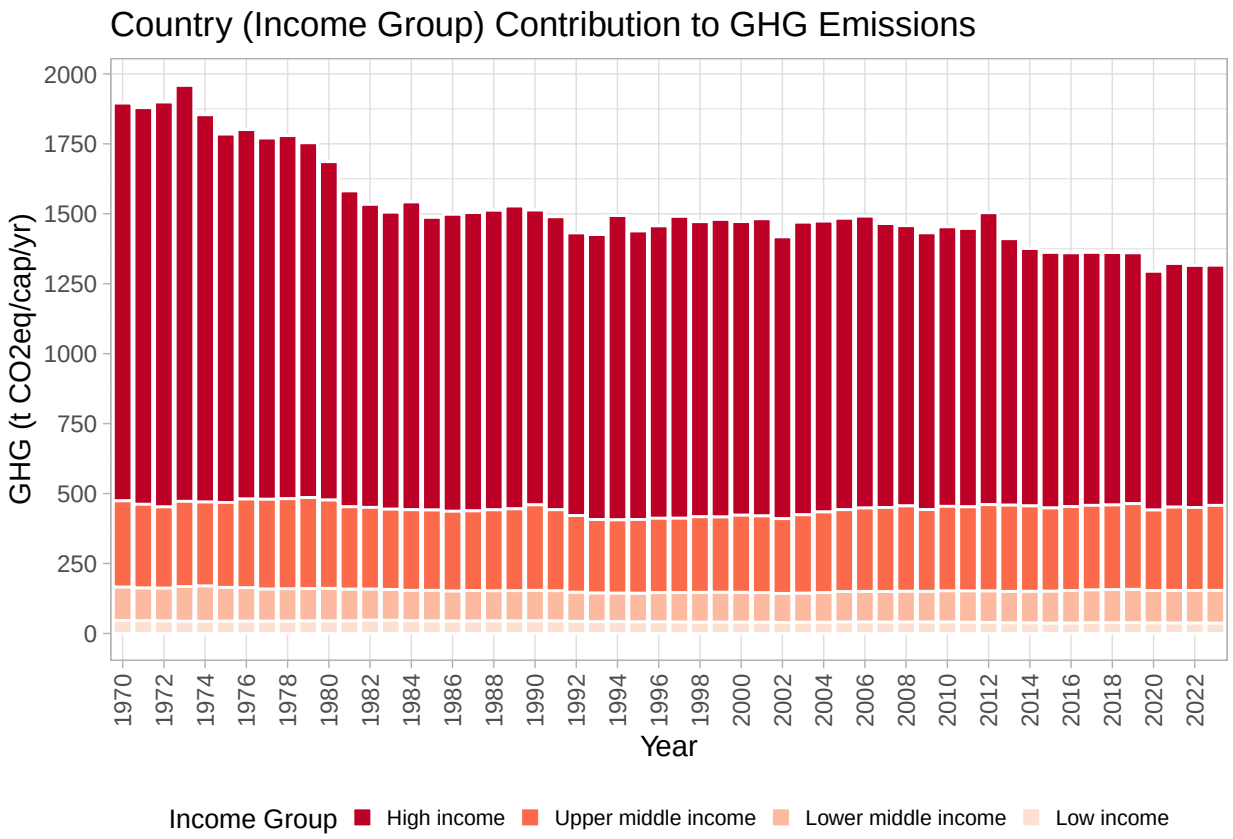


Countries GHG emission comparison

How do countries (classified as in The World Bank income groups) compare with respect to GHG emissions per capita?

For this analysis, data from the Excel sheet 'GHG_per_capita_by_country' were used. The country classification by income group was sourced from The World Bank Data Help Desk.

- Between 1970 and 1980, high income countries emitted more than twice the amount of GHG per capita compared to the combined total of upper middle income, lower middle income and low income countries.
- From 1970 to 2023, high income countries displayed an overall decrease in GHG emissions per capita, while the other countries showed a stable trend.

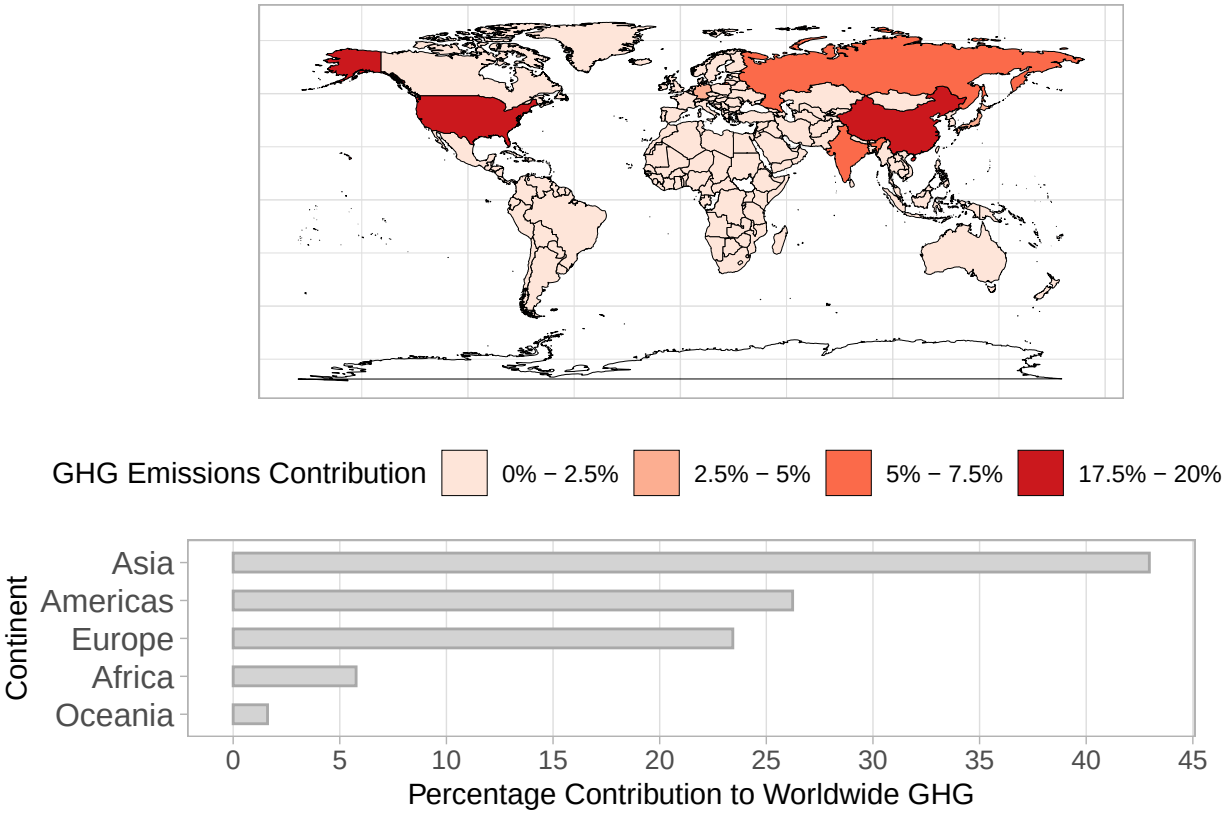


Contribution of individual countries and continents to worlwide GHG emissions

What is the contribution of individual countries and continents to the worldwide GHG emissions?

For this analysis, data from the Excel sheet 'GHG_totals_by_country' were used. Emissions data were summed across years, and the percentage of total GHG emissions was calculated for each country. Countries were classified into continents using data from the *countrycode* R package.

- China (19%) and United States (17.5%) are the leading contributors to global GHG emissions, followed by Russia (6.45%) and India (5.38%).
- Asia is the continent with the largest share of global GHG emissions, accounting for nearly 45%, while Oceania has the smallest contribution.
- The Americas rank second, contributing just over 25% of global emissions.



References

[1] EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO2, EDGAR CH4, EDGAR N2O, EDGAR F-GASES version EDGAR_2024_GHG (2024) European Commission