

Exploring Greenhouse Gas Emissions Data Sample Assignment 1

[*Note for instructors:* An excellent reading to assign in conjunction with this assignment is Baumert, Herzog and Pershing, *Navigating the Numbers: Greenhouse Gas Data and International Climate Policy*, World Resources Institute, Washington, DC, 2007. Chapters 1-6 (page 1-33) are particularly relevant.]

Data for this assignment can be obtained from the Climate Analysis Indicators Tool (CAIT) of the World Resources Institute. To access CAIT, go online to <http://cait.wri.org/>. If you are not already a registered user, click 'Register and Access CAIT.' Use your email address as your Login Name and create a password. After logging in, you will have access to a number of different CAIT products. Select 'CAIT', which will take you to the home page of CAIT. From the home page you can use the navigation bar on the left to access data and analytic tools. Before you get started, select 'Introduction' at the top left and take a moment to become familiar with CAIT. This will help you to find and download the data that you will need for this assignment. When you turn in your assignment, be sure to reference CAIT and any other sources that you used.

1. Create a list of the 20 countries that had the largest emissions of CO₂ from energy use in 2005 and another list of countries with the largest total emissions of all greenhouse gases from all sources.
(Tip: select 'GHG Emissions' from the left navigation bar and then select 'Yearly Emissions.' This will take you to a page with pull down menus for year and sector/activity and check-boxes to select greenhouse gases to display and whether to include emissions from Land-Use Change & Forestry and International Bunker Fuels. Once you have made the appropriate selections, click 'Update' to generate your data table. You can copy data from the table and paste into an Excel spreadsheet, or you can download to a spreadsheet directly by clicking 'Download' in the upper right of the page.)
 - a. What similarities and differences do you observe between the two lists?
 - b. What are some common characteristics of countries that are on both lists?
 - c. Some have suggested that international climate change negotiations should focus on the countries that are the largest emitters of greenhouse gases, and that both large developed and developing countries need to have obligations to limit emissions. Do you agree? Why?
2. Create lists of the 20 countries with the largest per capita emissions of CO₂ from energy in 2005; CO₂ per \$ GDP; and CO₂ per ton of energy consumed.
 - a. How much overlap is there between these lists and the lists of the countries that are the largest emitters of CO₂?
 - b. What are some common characteristics of countries with high per capita emissions of CO₂? High emissions per \$ GDP? High emissions per ton of energy consumed?
 - c. Should the rights to future emissions of greenhouse gases be allocated based on an equal amount per person, as some have proposed? Would this be an equitable solution? Would it result in an equal burden for each country?
3. Create a table with data for the following variables for the 20 countries that had the largest emissions of CO₂: CO₂ from energy only; CO₂ from energy, land use change and forestry; and all GHGs from all sources.
[Hint: You can customize the countries and regions that are displayed by CAIT. Select customize 'Regions and Countries' from the navigation bar on the left. Highlight countries in the left box and use [>>] to select. This will add them to "My Countries/Regions" box on the right. Select 'Display My Countries/Regions in Tables' and click 'Save Changes'. Now functions that you perform in CAIT will

display results only for the countries that you selected. When results are returned by CAIT, sort them alphabetically before downloading to a spreadsheet so that you can easily merge results for different variables into a single spreadsheet.]

- a. Construct a bar chart showing all three variables for all 20 countries. Copy your bar chart into your assignment. (Your chart will be easier to read if you sort the data in descending order for CO₂ emissions before creating your chart).
 - b. Which two countries have substantially greater emissions when land-use change and forestry are included? What's going on in those countries?
 - c. What happens to total net emissions of CO₂ from the US when emissions from land-use change and forestry are included? What's the reason?
 - d. For several countries, total emissions of all greenhouse gases is substantially more than for CO₂ alone. What do these countries have in common?
 - e. What implications would you draw from your chart for international climate policy?
4. Compare the shares of GHG emissions by gas for the US, EU-30, China, India, Brazil, South Africa, and the Least Developed Countries in 2005, excluding emissions from land use change and forestry.
(Hint: select 'Compare Gases' from navigation bar on left. Use the pull down menu for 'Country/Region to Display' to select the countries and regions you want. Note that individual countries are listed first in alphabetic order; regions and groups of countries are at the end of the list).
- a. What differences do you note? What do you think are the reasons for the differences?
 - b. Now include emissions from land use change and forestry. How does the picture change?
5. Using 'Compare Countries' from the navigation bar on the left of the CAIT page, compare emissions and other data of Annex I and Non-Annex I countries.
- a. What are the percentage contributions of Annex I and Non-Annex I countries to cumulative CO₂ emissions, atmospheric concentration of CO₂, and global mean temperature change for the period 1990 to 2006?
 - b. How do the percentages change if the period of analysis is extended back to 1950?
 - c. Back to 1850?
 - d. Should historical contributions to CO₂ concentrations and global climate change be accounted for in national limits for GHGs in international agreements? Why?