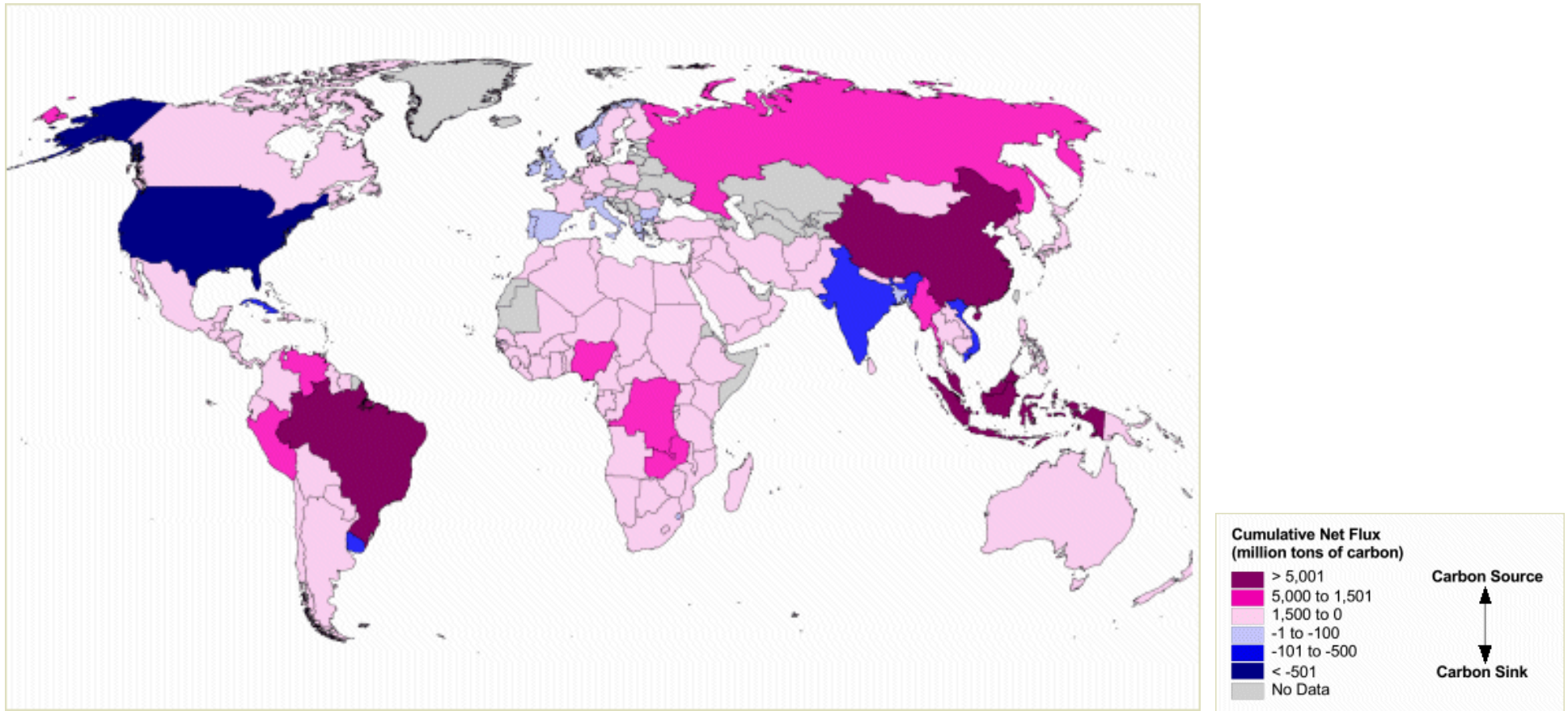


Net Flux of Carbon to the Atmosphere from Land-Use Change, 2000



Map Projection: Robinson

Citation: WRI, 2003. Carbon Emissions from Land Use, 1950 to 2000. Report to WRI from the Woods Hole Research Center. Available on-line through the Climate Analysis Indicators Tool (CAIT) at <http://cait.wri.org>. Washington, DC: World Resources Institute.

Analytical Overview:

Cumulative emissions from 1950 to 2000 were calculated by WRI based on annual data provided by R.A. Houghton at the Woods Hole Research Center in Woods Hole, MA. While a number of regional and global estimates have been calculated of carbon flux from land-use change, this is the first global data set with country-level data.

The complete methodology used to calculate carbon flux estimates is described on-line in R.A. Houghton's Data Note: Emissions (and Sinks) of Carbon from Land-Use Change.

Description:

Cumulative Emissions of CO₂ From Land-Use Change measures the total mass of carbon absorbed or emitted into the atmosphere between 1950 and 2000 as a result of man-made land use changes (e.g.- deforestation, shifting cultivation, vegetation re-growth on abandoned croplands and pastures). Positive values indicate a positive net flux ("source") of CO₂; for these countries, carbon dioxide has been released into the atmosphere as a result of land-use change. Negative values indicate a negative net flux ("sink") of CO₂; in these countries, carbon has been absorbed as a result of the re-growth of previously removed vegetation.

While the majority of global CO₂ emissions are from the burning of fossil fuels, roughly a quarter of the carbon entering the atmosphere is from land-use change. Together, CO₂ from fossil fuels and cement manufacture, CO₂ from land-use changes, and the emissions of five non-CO₂ gases--methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)--constitute the main sources contributing to climate change.

Country-level fluxes were calculated for each year between 1950 and 2000 by Houghton et al. based on their previously published regional estimates. WRI calculated cumulative emissions using the annual country-level data.

Data include emissions from living and dead vegetation disturbed at the time of clearing or harvest, emissions from wood products (including fuelwood), and emissions from the oxidation of soil organic matter in the years following initial cultivation.

The estimates do not explicitly include changes in carbon stocks that may result from various forms of management such as agricultural intensification, fertilization, no-till agriculture, thinning of forests, changes in species or varieties, and other silvicultural practices. Furthermore, the analysis ignores fluxes of carbon to or from ecosystems not directly affected by human activities such as agriculture or logging.

These data provide a very rough picture of the level of carbon entering the atmosphere from land-use change and should be treated as order-of-magnitude estimates. Houghton states that yearly flux estimates are uncertain on the order of $\pm 150\%$ for large fluxes, and ± 50 MtC/yr for estimates near zero. The cumulative emissions presented here, however, are more accurate than the data for each year.