Release Notes: National Ecological Footprint and Biocapacity Accounts, 2024 Edition

The 2024 Edition of the National Ecological Footprint and Biocapacity Accounts details Ecological Footprint and Biocapacity, by total and by component, at a national level and on a world-total basis, from 1961 to 2023. Ecological Footprint is measured for production, imports, exports, and consumption, where consumption equals production plus imports minus exports.

Accounts were generated for 246 countries and territories including the world, current and former/split/unified nations. Of these, 190 countries, plus the world, have a reliable timeline of data and are provided on an open-access basis.

Versions and updates

- Version 1.0. Public release on June 5, 2024.

Recommended citation:

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Terms of use:

Credits:

This edition was produced by Peri Dworatzek, Eric Miller, Kiona Lo, Elaine Howarth, and Sandy Kazubowski-Houston with the support and direction of the Footprint Data Foundation and its Science Advisory Committee, and with funding from York University and its Faculty of Environmental and Urban Change. This edition benefited from an accumulation of prior-year coding and research from analysts in the Ecological Footprint Initiative and from Global Footprint Network. This edition integrated data from global statistics that detail consumption, production, population, and economic parameters by year, and by country or the world. Key sources include the International Energy Agency (IEA), the Food and Agriculture Organization (FAO) of the United Nations and its PopStat, ProdStat, TradeStat, ResourceStat, and FishStat databases, Sea Around Us, UN COMTRADE, CORINE Land Cover, Global Agro-Ecological Zones (GAEZ), Global Land Cover (GLC), Global Carbon Budget, World Bank, International Monetary Fund, and Penn World Tables. This edition also used parameters from peer-reviewed science journals and thematic collections, with a full list of citations available upon request.

Definitions and concepts

Ecological Footprint is the area of land and water used to grow food and to harvest renewable materials, plus the area occupied by settlements and infrastructure, plus the area of forests needed to sequester human-generated carbon emissions. Biocapacity is a measure of the potential of an area to support an Ecological Footprint.

Ecological Footprint is measured in global hectares as the sum of the following components: fishing grounds, built-up land, cropland, grazing land, forest products, and forest carbon uptake. Biocapacity is also measured in global hectares as the sum of the following components: fishing grounds, built-up land, cropland, grazing land, and forest biocapacity (which provides the capacity to supply forest products or to absorb carbon).

Fishing Grounds	Area of marine and inland waters used to produce the fish, invertebrates, and aquatic plants that were captured or cultured by humans
Built-up land	Area of land occupied by human-built infrastructure, including housing and other buildings, roads and paved areas, and urban greenspace
Cropland	Area of cropland used to grow food and fibre crops consumed by humans, and for crops that humans fed to animals and cultured fish
Grazing land	Area of grassland needed to feed livestock beyond the feed supplied by crops
Forest Products	Area of forests harvested for timber products and pulpwood
Forest carbon up-take (Forest c-uptake)	Area of forests needed to sequester anthropogenic carbon emissions from the combustion of fuels including for electricity generation and for the production and transportation of globally traded goods, minus the proportion of anthropogenic emissions sequestered in the same year by the world's oceans

A global hectare is a hectare of land that provides a world-average amount of biological regeneration each year. Global hectares are derived from hectares by applying several conversion factors, including: a yield factor that relates national yield of a specific land type relative to world-average yield, an equivalence factor that relates components to one another based upon their level of biological productivity, and an intertemporal yield factor that relates changes in biological productivity over time. Expressing Ecological Footprint and Biocapacity in standardized units of global hectares allows for comparisons across the world and over time.

Further details about the concepts and calculations are provided in:

Lin, D., Hanscom, L., Murthy, A., Galli, A., Evans, M., Neill, E., Mancini, M.S., Martindill, J., Medouar, F.Z., Huang, S. and Wackernagel, M., 2018. Ecological footprint accounting for countries: updates and results of the national footprint accounts, 2012–2018. Resources, 7(3), p.58. doi:10.3390/resources7030058

Borucke, M., Moore, D., Cranston, G., Gracey, K., Iha, K., Larson, J., Lazarus, E., Morales, J.C., Wackernagel, M. and Galli, A., 2013. Accounting for demand and supply of the biosphere's regenerative capacity: The National Footprint Accounts' underlying methodology and framework. Ecological indicators, 24, pp.518-533. doi:10.1016/j.ecolind.2012.08.005

How Edition 2024 compares to the prior Edition 2023:

The 2023 edition had several methodological improvements to the national accounts, most notably incorporating estimates beyond the reported data. The 2024 edition does not have any significant methodological changes, rather this edition maintains the previous edition's improvements to the methodology and updates the data. Nevertheless, there are some variations of the data in the national accounts due to changes in the data from key data sources.

- Change in agricultural area (hectares) for grazing land and cropland from UN FAO ResourceStat

  The ResourceStat data series from the United Nations Food and Agriculture Organization (FAO), one of the key land-use data sources for the national accounts, had significant increases in the hectares of 'Temporary meadows and pastures' land cover. In the previous edition 59 countries had recorded data for 'Temporary meadows and pastures', compared to this edition 221 countries now have record data for that land cover type. As a result of countries having newly reported data for this land cover, their hectares of grazing land increased and subsequently grazing land Biocapacity increased. Additionally, there are other cascading effects due to the methodological relationship between the grazing land and cropland components, these 162 countries also had a decrease in the cropland area and Biocapacity.

- Change in Global Carbon Budget data for carbon uptake by the world's oceans

  The world Ecological Footprint shows slight differences between the 2024 edition and the 2023 edition going back on the full timeline. This can be explained by the new release of updated data from the Global Carbon Budget. The Global Carbon Budget includes data on the flows and sinks of carbon accumulation, an important aspect of this data for the national accounts is the data on carbon uptake by the world's oceans. This data continues to be refined by the Global Cabon Budget, and some changes in this data accounts for variations earlier on the timeline for the national accounts.

- Changes in carbon embodied in trade due to restructuring of the commodity classifications in UN Comtrade data source

  In the 2024 edition, there have been changes in the data used in the production of carbon embodied in trade due to the restructuring of classifications within the UN Comtrade data source. In previous editions, UN Comtrade released trade data consolidated under a single Standard International Trade Classification (SITC 1) for all commodities. The recent update, however, has led to the data being dispersed across 4 SITCs, rather than just 1. To align with these changes, the production team has transformed the data back into a single SITC (SITC 1).

The conversion was done based on expanded data and guidance from UN Comtrade. These changes have affected the carbon embodied in trade in countries to varying degrees, depending on their trade relationships.

Data availability:

Ecological Footprint and Biocapacity, by total and by component, of production and of consumption, at a national level and on a world-total basis, are available within a spreadsheet that can be download from https://footprint.info.yorku.ca/data/

The same data of national and global measures of Ecological Footprint (of consumption) and Biocapacity, and their components, are also available at https://data.footprintnetwork.org/ which presents the data in a more user-friendly way and with integrations of other data.

Data for all countries are categorized with a "data quality score" that informs whether all or some or none of the data for a particular nation in a particular year is available.

Additional details may be requested for one nation in one year in the form of an MS Excel Workbook that contains all the refined input data used to produce the results.

Questions and comments:

Please direct data-related questions or comments to footprint@yorku.ca or by mail to:

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York University's Ecological Footprint Initiative has the website: https://footprint.info.yorku.ca

The Footprint Data Foundation has the website: https://fodafo.org

The Global Footprint Network has the website: https://www.footprintnetwork.org