

Introduction to the Green Feeding Tool

The food industry generates approximately 30% of the emissions of greenhouse gases (GHG) – and the manufacture of commercial milk formula (CMF) contributes to that amount. Over 2 million tons of CMF for infants and young children were sold globally in 2018, generating GHG emissions of over 14-28 million tons, and using at least 10 million cubic meters of water.

Health authorities recommend exclusive breastfeeding of infants for 6 months, but fewer than half of 0-6-month-old infants globally are exclusively breastfed. Enabling women to breastfeed will reduce CMF sales and help mitigate climate change. Conversely, populations with high breastfeeding rates among infants and young children are more adaptive to key climate change risks to food security and health, and more resilient in emergencies and disasters.

The Green Feeding Tool calculates the carbon footprints (CFP) and water footprints (WFP) of CMF for infants 0-6 months. You have options to 1) use preloaded data or your own data, 2) look at scenarios and 3) adjust for necessary improvements in maternal diet. Making more visible the environmental impacts of infant formula will help to reduce the GHG emissions and water use and other environmental harms from CMF products displacing breastfeeding of infants and young children. The enhanced Green Feeding Tool (GFT-E) provides a module allowing alternative calculations of carbon and water footprints and Lost Milk which use data on CMF retail sales instead of survey data on infant feeding practices.

This tool will be valuable to a variety of users, including policymakers, advocates, researchers, and individual mother-baby dyads or their breastfeeding supporters. It can be used to advocate for breastfeeding protection, support and promotion as a 'carbon offset'. A 'carbon offset' is a reduction in GHG emissions to make up for emissions elsewhere. For example, an activity such as a project, program or policy that results in higher breastfeeding rates, might create carbon credits' that can be counted as an 'offset' to emissions from other activities. This could be part of funding schemes devised to create markets in GHG emission reduction, to achieve global targets for reducing emissions and mitigating climate change.

What the Green Feeding Tool does

The Green Feeding Tool provides country level estimates of GHG emissions and water use associated with CMF feeding of infants aged less than 6 months who are not exclusively breastfed. The Tool does not make calculations for older infants and young children 6-36 months. This is because there is insufficient data on their diets and associated environmental footprints once complementary feeding has begun, and calculations are complex to account for both commercial or home-prepared complementary foods.

The Green Feeding Tool can compare a country's GHG impact with user generated scenarios ("counterfactual") of higher or lower exclusive breastfeeding rates. The user can calculate the 'carbon offset' [1] for country-level policies and programs that alter breastfeeding rates. Such programs could include the Ten Steps to Successful Breastfeeding or the Baby Friendly Hospital Initiative (BFHI), the International Code, or Maternity Protection policies.

For example, the user interested in advocacy in Country X could apply evidence from studies of how Ten Steps to Successful Breastfeeding or BFHI implementation improves breastfeeding among infants 0-6 months. Enter actual or projected breastfeeding rates using the “counterfactual” function to generate a scenario showing potential GHG and water benefits of such interventions, compared to baseline calculations which use data on actual exclusive breastfeeding practices. Likewise, evidence on how improved maternity leave increases breastfeeding of children 0-6 months could also be used to show how these policies or measures lower countries’ GHG emissions and water use.

The Tool calculates the carbon and water footprint of CMF over the product lifecycle. It does not calculate an environmental footprint of breastfeeding including potential additional dietary intake, as women’s diets should always meet nutritional needs including during lactation. The Tool is not intended to measure the GHG impact of interventions addressing nutritional deficits in new mothers. However, the user may use the Tool to make an adjustment if mothers’ diets are inadequate, such as within a counterfactual scenario of policies, projects or programs which alter breastfeeding rates.

Results can be interpreted by using information from other sources such as the US Environmental Protection Agency Tool (insert link to EPA Calculator). For example, the 7,540 million (7.54 billion) kg of GHG CO₂ eq. emissions from 80 LMIC in the Green Feeding Tool is equivalent to 19,329 million (19.3 billion) miles driven by an average gasoline-powered passenger vehicle. For water, 2,562,536 million (2,562 billion) litres converts to 819,840 (2,562 X 320) Olympic sized swimming pools. One billion litres of water represents 320 Olympic swimming pools!(link to the page, language and numbers)

How the Tool makes the calculation

The Tool makes its calculations based on evidence (see References and Definition of Variables) that between 11-14 kg of carbon dioxide (CO₂ equivalent GHG and over 5000 litres of water are generated to feed a baby a kilogram of milk powder. It uses a standard recipe that meets international standards for composition of infant formula. The ‘low’ CFP estimate assumes 11kg of CO₂ eq. GHG emissions per kg of CMF, while the ‘high’ estimate assumes 14kg of CO₂ eq. GHG emissions.

Information on infant feeding practices is preloaded from the UNICEF IYCF database released in 2022. The user can use the preloaded data on breastfeeding practices and number of births, or enter their own data for these variables. Data from previous years or more recent releases can be entered. This option allows the user to also make calculations at sub-national or facility level if they have breastfeeding and birth data at this level.

- To make the calculations, the Tool counts infants receiving only water and breastfeeding as being ‘exclusively’ breastfed.
- Infants who are not breastfed are counted as being fed CMF. The tool assumes that infants who receive breastmilk substitutes will receive infant milk formula not animal milk or other foods. An infant aged 0-6 months who was not breastfed requires approximately 20kg of milk powder for that period, from UNHCR protocols.
- A partially breastfed infant is taken to require one third of that amount of milk powder (6.7kg), and the rest from breastfeeding.

The Green Feeding Tool water footprint calculations use available estimates of the amount of ‘green’, ‘blue’, and ‘grey’ water that is needed for making and using CMF to feed infants. ‘Green’ water is used to produce the food for dairy cows producing raw milk, such as grass; ‘blue’ water refers to extracted ground and surface water, and; ‘grey’ water refers to the amount of water required to deal with pollutants to meet water standards. These total over 5000 litres for every kilogram of milk powder produced.

- The 'blue water' use of CMF is 699 litres per kg (including for producing and processing the powdered milk, mixing powdered infant formula so it is ready to feed (around 7 litres per kg), and for sterilizing feeding equipment (46 litres)).
- 'Greywater' is 524 litres per kg of CMF.

The Tool also allows the user to add an approximate adjustment for the GHG impact of a nutrition intervention for malnourished women. This can be done by using the counterfactual function to create a scenario, such as for a program enhancing a mainly plant based maternal diet (GHG of 69 kg CO₂e for 6 month period) or a mixed plant based and animal based diet (GHG of 218 kg CO₂e for 6 month period).

The enhanced GFT-E makes carbon and water footprint calculations in the same way as the GFT, but uses Euromonitor retail sales data on CMF products instead of survey data on infant feeding practices for the calculations. "Standard formula" and "Special Baby Milk formula" products targeting infants aged <6 months are used for these estimates. By selecting this option, the user can compare carbon and water footprint results from using CMF retail sales data with results from using survey data on infant feeding.

What the Green Feeding Tool can be used for

Providing country level estimates of GHG emissions from CMF will help bring the importance of breastfeeding and achieving global breastfeeding targets to the attention of environmentalists, and climate change scientists. Also importantly the tool will assist a wider engagement with influential stakeholders by breastfeeding advocates.

This user-friendly and open access tool will help measure country's scope for mitigating GHG emissions and excess water use, and inform updating of national policies, programmes and investments plans. It can also indicate the harmful carbon and water impacts if action is not take to protect breastfeeding.

The Mothers' Milk Tool and the Green Feeding Tool

The Mothers' Milk Tool calculates the estimated total amounts of human milk that the mothers in a country produce for their children aged 0-36 months each year. At the same time the Tool provides for calculations for individual mothers or groups of mothers. It also provides a monetary value of breastmilk. The Green Feeding Tool complements and strengthens the Mothers' Milk Tool by its estimation of GHG emissions and water use for different scenarios of breastfeeding and milk formula consumption in the world, regions, and countries for infants aged 0-6 months. The Green Feeding Tool also complements the Mothers' Milk Tool by providing more refined estimates of 'Lost Milk' for the 0-6 months age group. It can do this because more specific UNICEF datasets are available for this 0-6 months age group which include both exclusive and predominant breastfeeding. Otherwise, it uses the same methods for calculating Lost Milk as the Mothers' Milk Tool.

The GFT-E provides a further estimate of 'Lost Milk' by using CMF retail sales data to calculate the human milk displaced by the use of these products.

This Tool also complements the Alive & Thrive Cost of Not Breastfeeding Tool focusing on costs of inaction.

The integration of the Green Feeding Tool component to the 'Lost Milk' calculations in the Mothers' Milk Tool and the Cost of Not Breastfeeding Tool can widen and strengthen advocacy for breastfeeding, Global Nutrition Targets for breastfeeding, and reducing the consumption of CMF.

Basic instructions

The Green Feeding Tool is based on Excel. You can use all functionalities of Excel in the Green Feeding Tool.

Users are advised to save the Excel file with your own preferred filename before starting the operation. The print facility creates a PDF file which you can save and print later. Save and print from time to time to keep a record of the operation using a different filename each time.


The components of the Green Feeding Tool

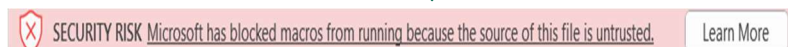
To learn more about the Tool, see the **Introduction**.

The Tool is composed of the following specific components:

1. Introduction page with links to Country Selection, Definition of Variables, References, and Acknowledgements
2. Country selection
 - i. Country selection. The GFT also includes a total for all of the 80 low- and middle-income countries that have suitable data on exclusive breastfeeding for infants (0-6 months) to be included in this Tool. The GFT-E includes additional countries including high income countries which have CMF retail sales data available, but does not include a total for countries.
3. Country information page
 - i. After selecting the country, the user can click Continue to see the carbon and water footprints calculation for infants aged 0-6 months for the selected country. If suitable data is not available no result will show.
 - ii. OR the user has options to Enter own data or compare with a Counterfactual scenario.
4. Data entry options
 - i. Option to Enter own data on births or feeding practices for infants aged 0-6 months
 - ii. Option for Counterfactual calculation of higher or lower breastfeeding rates for a fixed number of births
 - iii. Additional maternal diet module
 - Plant-based diet low and middle income country
 - Mixed plant- and animal-based diet high income country

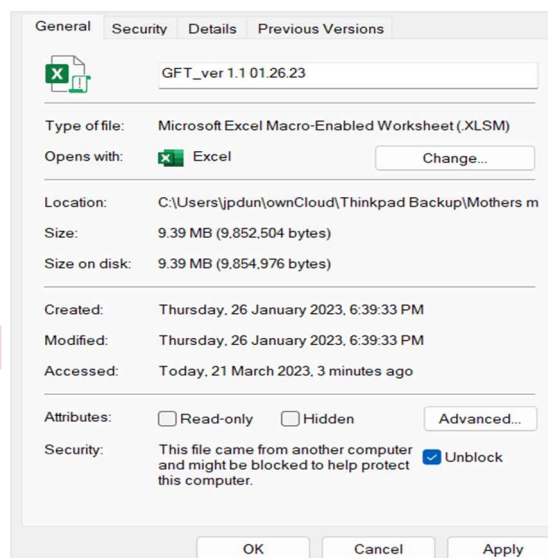
How to use the Tool

1. Open the Excel-based Tool :
 - i. If there is a prompt asking about macros, you must click Enable macros for the tool to work.
 - ii. On some computers, the file may open with a security risk warning. 

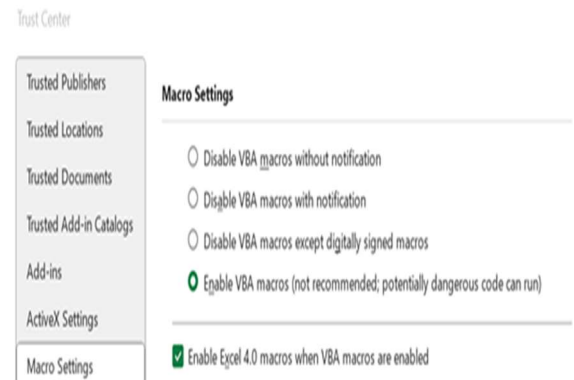


iii. If it does, close the file, right click on it in File Explorer and open Properties, go down to Security (as below), then click Unblock in the box and Apply. Then reopen the file. You only need to do this once. This unblocking allows macros to run **on this file only**.

iv. In some versions of Excel, you may need to amend the Trust Centre settings to 'enable Excel 4.0 when VBA macros are enabled'



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Option 1. Calculate CMF carbon and water footprints based on pre-loaded country (or global) data

A. Click on main menu to go to **Country Selection**

On the country selection page, choose the country of interest (or 80 countries) using the pop-down menu or by typing in the box, and choose if you want to use survey data on infant feeding practices, or retail sales data on CMF.

B. Select **Continue**

C. On the **Country Information** page

You will see the data the Tool uses for the country for different age categories for infants 0-6 months, and the total for that age group.

D. If you want to calculate the CMF using a counterfactual, please click **"Enter Counterfactual"** and press **CONTINUE**, if not proceed to letter E

E. Click **Carbon and Water Footprint** for CMF used in the country you selected.

Some countries are not included in the UNICEF datasets that are preloaded into the Tool. Or the user may have other data on births or for infant feeding practices <6 months that they prefer to use.

Option 2: Calculate CMF carbon and water footprints using your own data

A. Select the option for using 'survey data on infant feeding practices' or for using 'CMF retail sales data'. At the bottom of the **Country Information** page click the option to **Enter Own Data** and proceed to the next step

B. If you also want to calculate the CMF using a counterfactual, please click also **"Enter Counterfactual"** and press **CONTINUE**.

C. In both cases, you will be brought to a new page where you will be able to enter the following a) breastfeeding data for infants 0-6 months and/or b) livebirths for the year of interest and the counterfactual values if you also selected **"Enter Counterfactual"**

D. Press **Continue** when you are done entering all the relevant data. (Ignore #DIV/0!).

E. You will be brought back to the **Carbon and Water Footprint** page where you will see the inputted data reflected

Some users may want to explore scenarios for lower or higher CMF to reflect the effects of policies, programs or projects on infant feeding practices.

Option 3: Calculate counterfactual scenarios for GHG emissions of CMF compared to baseline levels

Please note, for countries where there are no preloaded data the user must enter own data as per option 2 and click both "enter own data" and " enter counterfactual data"

A. On the **Country Information** page click the option to **Enter Counterfactual Data**

B. Press Continue when you are done entering your own data. (Ignore #DIV/0!).

C. Click on **Carbon and Water Footprint** to see the Tool calculations of greenhouse gas emissions and water use for CMF under baseline and counterfactual scenarios using the data you entered for the country you selected

Option 4: Calculations for maternal diet

A. Click **Enter Own Data** and/or **Enter Counterfactual Data**.

B. To calculate using the pre-loaded dataset, enter the figures which are in the Available Data column into the column for **Enter your Data**. (Ignore #DIV/0!).

C. Select one of the two **Alternative maternal diet assumptions**

D. On the **Carbon and Water Footprint** page you will see the Carbon Footprint contribution and excess (difference between the calculated Carbon Footprint and the Carbon Footprint adjusted for maternal diet) from the maternal diet assumption that you have chosen.