



MOTHERS'
MILK TOOL

MOTHERS' MILK TOOL

The value of nourishing newborns
and nations



Australian
National
University



alive&thrive
nourish. nurture. grow.

fhi
solutions



ACKNOWLEDGEMENT

This Tool was commissioned by the Innovation Incubator at FHI Solutions.

FHI Solutions is a subsidiary of FHI 360 and an international nonprofit supported by three Centers of Excellence including Alive & Thrive, Intake and 1,000 Days.

We would also like to acknowledge research funding support from the Australian Research Council (FT140101260).

ABOUT THE TOOL

The Mothers' Milk Tool has been developed to make more visible the economic value contributed to society by women's unpaid care work through breastfeeding of infants and young children at the country and individual levels. The user can use the preloaded data or enter their own data for most variables.

The Mothers' Milk Tool will be of value to a variety of users, including policymakers, advocates, researchers, national accountants and statisticians, and individual mother/baby dyads or their breastfeeding supporters.

The Tool calculates the total amounts of human milk that the mothers in a country produce for children each year. This is computed by combining data for a country on 1) number of infant and young children aged 0-36 months; 2) breastfeeding practices 3) estimates of daily human milk intake by child age. The Tool also calculates a country's 'lost milk', which is the milk that is not produced because breastfeeding is not at biologically feasible potential levels.

This user-friendly and open access tool is being developed to help measure progress toward national and global breastfeeding targets, and inform updating of national policies, programmes and investments plans. By helping to mobilize action and motivate upscaling of investments, the tool will help ensure greater investments and resources are allocated towards enabling women and children to realise their human rights, including to breastfeeding.



The Tool provides a monetary value of the milk produced by mothers to breastfeed their children. This uses a price for donated human milk. The Tool also allows individual mothers to calculate how much milk they have produced for their child and its monetary value.

MEASURING AND VALUING WOMEN'S PRODUCTIVITY



The Mothers' Milk Tool has been created to better acknowledge the role, health and economic contribution of mothers to society by women's unpaid care work through breastfeeding of infants and young children. It provides economic data that can assist in better policy decision-making and investments.

The decline in breastfeeding in past decades has resulted in the loss of an important and valuable national food resource in many countries.¹ At present less than half of the world's children are breastfed adequately.^{2,3}

Breastfeeding is important for the lifelong health and development of children as well as for the reproductive health of women. Exclusive breastfeeding for the first six months and continued breastfeeding to two years and beyond is well established in scientific studies⁴ and by evolved and traditional practice⁵ as being important for survival, health and child development. Breastfeeding is also crucial for planetary health as it minimises energy and water use, and thereby harmful emissions and resource depletion.



The limited progress to meet the global and national breastfeeding targets towards universal levels has important economic implications for countries. Breastfeeding helps contain health system costs and the economic costs of mortality of women.

The Australian National University in a research collaboration with Alive & Thrive Southeast Asia and with funding from FHI Solutions' Innovation Incubator has developed the Tool to quantify the economic loss for communities, countries and globally with inadequate breastfeeding, as well as the amount and monetary values of milk produced.⁶⁻⁸

It complements the Alive & Thrive [Cost of Not Breastfeeding Tool](#), and the IBFAN *World Breastfeeding Trends Initiative Costing Tool* in making the business case for breastfeeding protection, support and promotion.

Key findings

The Mothers' Milk Tool will be of value to a variety of users, including policymakers, advocates, researchers, national accountants and statisticians, and individual mother/baby dyads or their breastfeeding supporters.

It can support tracking of progress on nutrition and breastfeeding targets, by assisting food and health policymakers and public officials to account for breastfeeding in food balance sheets and economic statistics.

The Tool also allows individual mothers to calculate how much breastmilk they have produced for their child and its value, depending on how many months the child is breastfed during the first 36 months of life. This recognition of the value of women's unpaid work through can be very motivating for mothers to maintain exclusive breastfeeding and continue to two years and beyond.

Global human milk production

Around
35.6
billion

litres of human milk are provided each year by the world's mothers when they breastfeed their infants and young children (0-36 months). This production* of a uniquely valuable food is not visible in economic statistics or food data, and protecting and maintaining this valuable capacity is easily neglected.

Nearly
21.9
billion

litres are globally produced more each year if virtually all infants and young children were breastfed adequately. This represents a lost milk* value of more than US\$2.2 trillion a year in monetary terms*.

Around
38%

of the biologically feasible potential* level of global human milk production is currently forfeited due to inadequate breastfeeding of infants and young children.

Food supply and food security

Breastfeeding contributes importantly to a country's food supply and food security. In Norway, human milk is already counted in the country's food statistics.⁹

Countries can rely on the human milk produced by breastfeeding women – from mother to baby is the world's shortest and most reliable baby food supply chain.

By contrast, countries which do not provide enabling environments for breastfeeding have a high percentage of lost milk, and are dependent on access to commercial milk formula products. Especially in emergencies and disasters, which are more common with climate change, food for infants and young children may be precarious, unavailable or contaminated.

In some countries where breastfeeding is uncommon, such as Ireland or the United Kingdom, around 80% of this crucial potential food supply is lost. In other countries, such as the United States, Brazil, Norway or Australia, around two thirds of the capacity to provide human milk is lost due to inadequate protection, promotion and support for breastfeeding.

On the other hand, countries with supportive breastfeeding cultures and policy environments, such as India, Vietnam and Kenya, no more than a third of the milk is lost, and in Nepal nearly all potential production is available to provide the perfect nutrition foundation for the good health of its mothers and their children.

* see Technical Annexure

It takes a village

Breastfeeding is not only an individual decision, but a decision based on many factors in individual mothers' social and economic environment.¹⁰ Women's traditional skills and knowledge about breastfeeding is important cultural capital. Breastfeeding is also a human rights issue for both mother and child.


Ensuring both mother and child can breastfeed relies on governments, health workers, communities and families providing supportive environments.





Policymakers must invest in national policies and programs to support breastfeeding


Investing in breastfeeding is an investment in not only improving the lives of children and women, but also an investment in the economic future. Greater political commitment is needed to support women to breastfeed, make breastfeeding the new norm, and realize a wealth of protections for children, families, and societies alike. The Global Breastfeeding Collective calls upon policymakers to quickly adopt, strengthen, and implement the following actions:

 **Increase funding** to raise breastfeeding rates from birth to two years and beyond.

 Fully implement the International Code of Marketing of Breastmilk Substitutes through **strong legal measures that are enforced and independently monitored** by organizations free from conflicts of interest.

 **Enact paid family leave and workplace breastfeeding policies**, building on the International Labour Organisation's maternity protection guidelines as a minimum requirement, including provisions for the informal sector.

 **Implement the Ten Steps to Successful Breastfeeding** in maternity facilities, including providing breastmilk for sick and vulnerable newborns.

 **Improve access to skilled breastfeeding counseling** as part of comprehensive breastfeeding policies and programs in health facilities.



Strengthen links between health facilities and communities, and encourage community networks that protect, promote, and support breastfeeding.



Strengthen monitoring systems that track the progress of policies, programs, and funding towards achieving both national and global breastfeeding targets.



The evidence is clear: investing in policies and programs that support women to breastfeed saves lives and provides a high return on investment.

HOW THE RESULTS ARE CALCULATED

Human milk production

The Tool calculates the total amounts of human milk that the mothers in a country produce for children each year. This is computed by combining UNICEF or official data for a country on 1) number of infant and young children aged 0-36 months; 2) breastfeeding practices 3) estimates of daily human milk intake by child age.

The Tool assumes that a breastfeeding mother will produce about 431 litres of milk during 36 months of lactation (or 345 litres over 2 years). This is based on scientific studies,^{11,12} and is a conservative assumption.

Calculations are for any breastfeeding and do not distinguish exclusive breastfeeding. This means it is a minimum estimate of the milk produced. Better country data on breastfeeding is needed for more accurate estimates, particularly for high income countries.

The calculations can easily be provided for your country using the Tool.¹³ If your country has inadequate breastfeeding data, the Tool includes an automatic process that can fill the data gaps for most countries.

Lost milk

The Tool also calculates a country's 'lost milk', which is the milk that is not produced because breastfeeding is not at biologically feasible potential levels. The lost milk is the difference between the milk actually produced at current breastfeeding rates, and the milk that would be produced if 98% of mothers breastfed for six months and to at least 36 months.¹⁴

You can use the Tool for calculating the amount of lost milk for your country.¹³

Valuing human milk in monetary terms

The value of breastfeeding is far beyond its monetary value. It provides nurture and care as well as nourishment and nutrition. However, money is the language of policymakers.

The Mothers' Milk Tool uses well-established methods to calculate the amount and market value of human milk production.⁶ In addition the Tool provides a monetary value of the milk produced by mothers to breastfeed their children. It uses a typical price charged by donor human milk banks of \$100 per litre (the monetary value is available in US\$ and in the local currency). It is approximately \$3 per ounce.¹⁵

This is based on the official price charged for fresh donated milk within Norway's human milk banking system.³ Other milk banks charge much more. Various other ways of placing a monetary value on milk include using the wage of a wetnurse as a proxy, or putting a monetary value on the mother's time.

Using the price of commercial milk formula is not appropriate because it is not an analogous product,¹⁶ and does not take account of the health costs or environmental impacts of its use.¹⁷

For the calculations of the amount and value of human milk produced and lost due at the breastfeeding rates in your country, you can use the monetary value in the tool, or substitute a different price.¹³



Country production and value

[Return to country information](#)

[Save](#)

[Print](#)

GLOBAL

Total for 3 years (Estimate for 36 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	35,555.97	3,555,597.42	3,555,597.42
2. Potential production of breastmilk	57,490.49	5,749,049.13	5,749,049.13
3. Lost breastmilk	21,934.52	2,193,451.71	2,193,451.71
4. Percent lost	38.2%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

GLOBAL

Total for 0 to <6 months (Estimate for 6 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	14,352.29	1,435,229.31	1,435,229.31
2. Potential production of breastmilk	15,754.63	1,575,463.46	1,575,463.46
3. Lost breastmilk	1,402.34	140,234.14	140,234.14
4. Percent lost	9%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

GLOBAL

Total for 6 to <24 months (Estimate for 18 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	18,653.24	1,865,323.82	1,865,323.82
2. Potential production of breastmilk	30,213.88	3,021,388.46	3,021,388.46
3. Lost breastmilk	11,560.65	1,156,064.65	1,156,064.65
4. Percent lost	38%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

GLOBAL

Total for 1st year (Estimate for 12 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	23,834.85	2,383,485.38	2,383,485.38
2. Potential production of breastmilk	28,109.46	2,810,946.24	2,810,946.24
3. Lost breastmilk	4,274.61	427,460.87	427,460.87
4. Percent lost	15%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

GLOBAL

Total for 2nd years (Estimate for 12 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	9,170.68	917,067.75	917,067.75
2. Potential production of breastmilk	17,859.06	1,785,905.68	1,785,905.68
3. Lost breastmilk	8,688.38	868,837.92	868,837.92
4. Percent lost	49%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

GLOBAL

Total for 3rd year (Estimate for 12 data entries)	Volume in million liters	Value in million USD	Value in million USD Dollar
1. Actual annual production of breastmilk	2,550.44	255,044.29	255,044.29
2. Potential production of breastmilk	11,521.97	1,152,197.21	1,152,197.21
3. Lost breastmilk	8,971.53	897,152.92	897,152.92
4. Percent lost	78%		

Exchange rate US\$ 1: 1 US Dollar
Data source: Global Average

Individual production and value

GLOBAL

☰ Main menu

📄 Save

📄 Print

Any breastfeeding (BF)

Month	BF (Y)	Month	BF (Y)	Month	BF (Y)	Month	BF (Y)
0 < 1	Y	10 < 11	Y	19 < 20	Y	28 < 29	Y
1 < 2	Y	11 < 12	Y	20 < 21	Y	29 < 30	Y
2 < 3	Y	12 < 13	Y	21 < 22	Y	30 < 31	Y
3 < 4	Y	13 < 14	Y	22 < 23	Y	31 < 32	Y
4 < 5	Y	14 < 15	Y	23 < 24	Y	32 < 33	Y
5 < 6	Y	15 < 16	Y	24 < 25	Y	33 < 34	Y
6 < 7	Y	16 < 17	Y	25 < 26	Y	34 < 35	Y
7 < 8	Y	17 < 18	Y	26 < 27	Y	35 < 36	Y
8 < 9	Y	18 < 19	Y	27 < 28	Y		

This form is for one child. You can estimate for other child(ren) by clicking on Reset. Type (Y) if you breastfed during the particular month.

🔄 Reset

Mother's milk volume and value for the child

Total for the breastfeeding period (Estimate for 36 data entries)	Volume in liters	Value in USD	Value in local currency
1. Actual production of breastmilk	431	43,110	43,110

Default price/liter of breastmilk: 100 US Dollar

Rate to US\$: 1 US Dollar

Enter price/liter of breastmilk in local currency:

INSTRUCTIONS TO USE THE TOOL

The tool is based on Excel. You can use all functionalities of Excel in the tool. Excel has internal controls which are unaltered, so ignore warnings about enabling macros or updating external links when starting the tool. Keep clicking X to close any Microsoft login requests.

User are advised to save the Excel file using 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 tool includes two tabs, **Instruction** and **Main menu** that has links to calculations for countries and individual mothers.



The components of the tool


The tool is composed of the following specific components:

 **Introduction page**

 **Main menu**

 Country calculator

- Using preloaded data
- Using users' data

 Individual calculator

How to use the tool

1. Open the Excel-based tool:

- If there is a prompt asking about macros, click **Enable macros** to ensure full functionality of the tool. Keep clicking X to **close Microsoft login** messages.
- If there is a prompt about external link updates, click **Don't update**
- Use the View menu to zoom in or out for the correct magnification

2. After, click on the tab **Main menu** for two options:

Option 1

- 1 Click on **Country calculator**
- 2 Choose the country of interest (or global) using pop-down menu or typing in the box.
- 3 Review whether breastfeeding rates are complete
 - a. If complete, and you want to use these data, go to Step 4
 - b. If not complete, click on **Impute missing data**
 - ⚠ *If you decide not to impute the missing data, the calculation of production and value will be limited to available data.*
 - c. If there is no breastfeeding data for the country or you want to enter different data, click on **Data entry**
 - d. (optional) You can enter your own price per litre of breastmilk in local currency.
 - ⚠ *Minimum three data points are needed for the imputation of missing data. In step 3.c., you can also change the number of live births, currency exchange rate, and price of breastmilk.*
- 4 Click on **Production and value** and scroll down to see the results for your country for different age categories
 - ⚠ *Always save before starting a new calculation.*

Option 2

- 1 Click on **Individual calculator**
- 2 Select the country
- 3 Enter relevant information, including:
 - a. Enter “Y” for each month the child was still breastfed
 - b. Look for the values on the table on the right
 - c. Click Reset to enter the information of the other child
 - d. (optional) You can enter your own price per litre of breastmilk in local currency.



REFERENCES

Number of infants and young children

United Nations. (2019). World Population Prospects 2019 ST/ESA/SER.A/423 <https://population.un.org/wpp/Download/Standard/Population/>

Country breastfeeding practices and biological feasible potential breastfeeding

UNICEF Global database 2021. Available from: <https://data.unicef.org/topic/nutrition/breastfeeding/>.

Rollins, N. C., et al. (2016). "Why invest, and what it will take to improve breastfeeding practices?" *Lancet* 387(10017): 491-504.

Haggkvist, A. P., et al. (2010). "Prevalence of breast-feeding in the Norwegian Mother and Child Cohort Study and health service-related correlates of cessation of full breast-feeding." *Public Health Nutrition* 13(12): 2076-2086.

Sellen, D. W. (2001). "Comparison of infant feeding patterns reported for nonindustrial populations with current recommendations." *Journal of Nutrition* 131(10): 2707-2715.

Daily milk intakes

Hatloy A & Oshaug A (1997) Human milk: an invisible food resource. *J Hum Lact* 13, 299-305.

Butte, N., et al. (2002). Nutrient adequacy of exclusive breastfeeding for the term infant during the first 6 months of life. Geneva, World Health Organization.

Monetary value of human milk

Grovslie AH, Gronn M. Donor milk banking and breastfeeding in Norway. *J Hum Lact* 2009; 25(2): 206-10.

Smith JP (2013) "Lost milk?": Counting the economic value of breast milk in gross domestic product. *J Hum Lact* 29, 537-546.

Grøvslien, A. H. (2021). Personal communication, 28 June.



Methodological aspects: Studies of the economic value of breastfeeding

Berg A (1973) The crisis in infant feeding practices. In *The nutrition factor; its role in national development* [A Berg, editor]. Washington: The Brookings Institution.

Rohde JE (1981) Mother milk and the Indonesian economy: a major national resource. *Indian journal of pediatrics* 48, 125-132.

Almroth S & Greiner T (1979) The economic value of breastfeeding. vol. Number 6, Monograph Series. New York: Cornell University Program on International Nutrition.

Oshaug A & Botten G (1994) Human milk in food supply statistics. *Food Policy* 19, 479-482.

Hatloy A & Oshaug A (1997) Human milk: an invisible food resource. *J Hum Lact* 13, 299-305.

Gupta A & Khanna K (1999) Economic value of breastfeeding in India. *Natl Med J India* 12, 123-127.

Smith JP (1999) Human milk supply in Australia. *Food Policy* 24, 71-91.

Aguayo VM, Ross J, Saunero R et al. (2001) [Monetary value of breast milk in Bolivia]. *Rev Panam Salud Publica* 10, 249-256.

Ross J, Chunming C, ZAZhenying F et al. (2001) Calculating the effects of malnutrition on economic productivity health and survival in China using PROFILES. New York.

Aguayo VM & Ross J (2002) The monetary value of human milk in Francophone west Africa: a PROFILES analysis for nutrition policy communication. *Food Nutr Bull* 23, 153-161.

Smith. (2012) Including Household Production in the System of National Accounts (SNA) - Exploring the Implications of Breastfeeding and Human Milk Provision. Paper Prepared for the 32nd General Conference of The International Association for Research in Income and Wealth. Boston, USA, August 5-11, 2012.

Smith JP (2013) "Lost milk?": Counting the economic value of breast milk in gross domestic product. *J Hum Lact* 29, 537-546.

Other references

1. Berg A. The crisis in infant feeding practices. In: Berg A, ed. The nutrition factor; its role in national development. Washington: The Brookings Institution; 1973.
2. United Nations Children's Fund (UNICEF). Global UNICEF Global Databases: Infant and Young Child Feeding. New York; 2020. Available from: <https://data.unicef.org/topic/nutrition/infant-and-young-child-feeding/#status>. 2020.
3. Rollins NC, Bhandari N, Hajeebhoy N, et al. Why invest, and what it will take to improve breastfeeding practices? *The Lancet* 2016;387:491-504.
4. Victora CG, Bahl R, Barros AJ, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet* 2016;387:475-90.
5. Sellen DW. Comparison of Infant Feeding Patterns Reported for Nonindustrial Populations with Current Recommendations. *J Nutr* 2001;131:2707-15.
6. Smith JP. Human milk supply in Australia. *Food Policy* 1999;24:71-91.
7. Smith JP. Including household production in the System of National Accounts (SNA) – Exploring the implications of breastfeeding and human milk provision 2012 August 2012
8. Smith JP. "Lost milk?": Counting the economic value of breast milk in gross domestic product. *J Hum Lact* 2013;29:537-46.
9. Norwegian Directorate of Health. Utviklingen i norsk kosthold 2020. Matforsyningsstatistikk. [Trends in the Norwegian diet 2020. Food supply statistics]. Oslo: Helsedirektoratet; 2020.
10. Baker P, Santos T, Neves PA, et al. First-food systems transformations and the ultra-processing of infant and young child diets: The determinants, dynamics and consequences of the global rise in commercial milk formula consumption. *Matern Child Nutr* 2021;17:e13097.
11. Butte N, Lopez-Azarcon M, Graza C. Nutrient adequacy of exclusive breastfeeding for the term infant during the first 6 months of life. Geneva: World Health Organisation; 2002.
12. Hatloy A, Oshaug A. Human milk: an invisible food resource. *J Hum Lact* 1997;13:299-305.
13. Valuing breastfeeding through the Mothers' Milk Tool. 2022. (Accessed 5 May 2022, at <https://nceph.anu.edu.au/research/tools-resources/valuing-breastfeeding-through-mothers-milk-tool>.)
14. Haggkvist AP, Brantsaeter AL, Grjibovski AM, Helsing E, Meltzer HM, Haugen M. Prevalence of breast-feeding in the Norwegian Mother and Child Cohort Study and health service-related correlates of cessation of full breast-feeding. *Public Health Nutr* 2010;13:2076-86.
15. Grovslie AH, Gronn M. Donor milk banking and breastfeeding in Norway. *J Hum Lact* 2009;25:206-10.
16. Oshaug A, Botten G. Human milk in food supply statistics. *Food Policy* 1994;19:479-82.
17. Smith JP. A commentary on the carbon footprint of milk formula: harms to planetary health and policy implications. *Int Breastfeed J* 2019;14:49.



MOTHERS' MILK TOOL

Download the Tool 



The photos used in this document are copyright of Alive & Thrive or the Australian National University, contributed by various photographers, or purchased from Envato Elements.



Australian
National
University



alive&thrive
nourish. nurture. grow.

fhi
solutions