IDF Carbon Footprint Verification Tool for FARM ES Version 3.0

August 2025

INTRODUCTION

FARM Environmental Stewardship is U.S. dairy's voluntary, on-farm GHG footprint and environmental assessment platform for dairy farmers. Cooperatives and processors representing 80% of the U.S. farmgate milk supply participate in FARM Environmental Stewardship. Through their efforts, over 6,000 farms have completed a FARM Environmental Stewardship assessment.

The FARM Program and Dairy Management Inc. collaborated to update FARM Environmental Stewardship in order to update to the latest science, address some of the changes in GHG accounting methodologies, and to provide dairy farmers with a more robust tool offering better insights.

Launched in October 2024, FARM Environmental Stewardship Version 3.0 uses the Ruminant Farm Systems (RuFaS) model. RuFaS is a process-based model wherein biological, physical, and chemical cycles are modeled for the whole-farm system on a daily timestep in order to generate the results. The farm's location is used to pull in relevant soil, temperature, and precipitation data.

To foster transparency in methods, FARM completed the IDF LCA Verification Tool Version 1 to show how FARM Environmental Stewardship Version 3.0 methodology compares against the Bulletin of the IDF N°520/2022: The IDF global Carbon Footprint standard for the dairy sector. The results of the verification tool are contained in the subsequent pages.

Any questions can be directed to dairyfarm@nmpf.org.

IDF Carbon Footprint Verification Tool

Version 1.0 - Cradle to Farm Gate Only

General Information

The following captures information about the scope of the analysis and is used to dete

What portion of the product lifecycle is covered by the analysis? **(§4.2)**
What is the functional unit for the analysis? **(§4.3)**
What type of LCA analysis has been applied? **(§4.1)**

What is the purpose of the analysis? (Check all that apply)
There are additional requirements on the type of emissions models used in studies that are intended for any external purpose (5.2).

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What environmental impacts are included?
At the moment this tool only assesses performance against the carbon footprint standard. These options have been included to enable users to indicate where other impacts have been considered as part of the same analysis. This provides transparency and provides a basis for future expansion of the tool.

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Global Warming / Carbon Footprint Impacts

What GWP100 conversion factors have been used?

ermine which of the following sections need to be completed.

1. Cradle-to-farm gate
1. Fat and Protein Corrected Milk
Attributional

Internal use
External communication
Product marketing claims
Comparative study

Global Warming / Carbon Footprint
Acidification
Eurotrophication (unspecified)
Eurotrophication, terrestrial
Eurotrophication, freshwater
Eurotrophication, marine
Air pollution / particulate matter
Toxicity (unspecified)
Ecotoxicity (unspecified)
Ecotoxicity, terrestrial
Ecotoxicity, freshwater
Human toxicity (unspecified)
Human toxicity, cancer
Human toxicity, non-cancer
Resource depletion (unspecified)
Resource depletion, fossil
Resource depletion, mineral and metals
Ozone depletion
Ionisation radiation
Photochemical ozone formation
Land use (also accounting for e.g. soil quality)
Land occupation
Water use (Scarcity adjusted / AWARE)

AR6 (CH4=27 & N2O=273)

IDF Carbon Footprint Verification Tool

On Farm Analysis

	Response	Status	Guidance
This includes all activities up to the farm gate			
How has the **Functional Unit** been calculated for farm gate emissions? **(§4.3.1)**			
Functional Unit Volume	2. Milk Produced		*Only the milk that leaves the farm/system should be considered*
Energy Content (Mcal / kg)	4. FPCM calculated directly		*Good for bovine milk with lactose at 4.85%*
FPCM (kg)	3. Milk x (0.1226 x Fat% + 0.0776 x TP% + 0.2534)		*Using Crude Protein, good for bovine milk with lactose at 4.85%*
How is the **Milk / Liveweight Allocation** calculated? **(§5.4.2)**	1. Biophysical		
The allocation between milk production and liveweight (meat) is a key point of the IDF standard			
What equation is used for the biophysical allocation?	1. IDF 2022		
What data is used?	5. Combination of Primary and Secondary Data		
Are non-replacement calves sold included in LWT exports?	1. Yes		

Use the area below for any additional comments or notes relating to the **Milk / Liveweight Allocation**

Are **Enteric Emissions** included? **(§5.2.1)**	1. Yes		
Methane emissions from the digestive process.			
Does this include on farm replacements and breeding stock?	1. Yes		
How are the emissions calculated?	3. IPCC Tier 3		
Please provide a reference for the specific model used			
What data is used for the calculation?	4. Combination of Primary and Secondary Data		

Use the area below for any additional comments or notes relating to the **Enteric Emissions Calculation**

For lactating cows, equation from: Niu, M., et al (2018).https://pubmed.ncbi.nlm.nih.gov/29450980/

For other animal classes, IPCC equation

Are emissions from **Manure Management** included? **(§5.2.2)**	1. Yes		
This includes all emissions related to the storage and treatment of manure			
How are the emissions calculated?	3. IPCC Tier 3		
Please provide a reference for the specific model used			
What data is used for the calculation?	4. Combination of Primary and Secondary Data		
Does manure leave the farm?	1. Yes		
What allocation has been used for manure exports? (§5.4.2)	4. Cut-off at farm gate		

Use the area below for any additional comments or notes relating to **Manure Management Emissions**

Mostly IPCC Tier 3 with some elements calculated using IPCC Tier 2 equations.

Are emissions from **Homegrown Feed Production** included?	1. Yes		
This includes all on farm feed production, including pasture and crops			
What data is used?	5. Combination of Primary and Secondary Data		

Included Activities / Emissions

N_2O emissions from soil (§5.2.3)	1. Yes		
Emissions from manure deposited or used as fertiliser (§5.2.3)	1. Yes		
How are N2O emissions calculated? (§5.2.3)	1. IPCC Tier 1		*Consider moving to a higher tier model if data is available*
CO_2 emissions from lime use on soils	1. Yes		
Fuel and energy use	1. Yes		
Production of fertilisers	1. Yes		
Transportation of fertilisers	1. Yes		
Capital goods	3. Not Relevant		*Including emissions associated with Capital Goods is optional*
Land use change (§5.5.1)	3. No		*This is element is required unless there is evidence it is not relev*
Harvesting loss and crop residue emissions	1. Yes		
Is any feed sold / exported off the farm?	2. No		

Use the area below for any additional comments or notes relating to **Homegrown Feed Production**

Currently (summer 2025) uses IPCC Tier 1 for nitrous oxide, but will be updating within next 6 months to 1 year to use IPCC Tier 3.

LUC is reported for purchased feeds but not available at this time for homegrown feeds.

Which emissions from **Peat Soils** are included? **(§5.5.4)**	3. Not Relevant		*Provide evidence supporting omitting this element*
This includes emissions from drained organic/peat soils on the farm			
How are these reported?	4. Don't know		*Please check again :-)*

Use the area below for any additional comments or notes relating to emissions from **Peat Soils**

Peat soils are not relevant to U.S. dairy emissions.

Are emissions from **Imported Feed** included?	1. Yes		

This includes all feed material imported from outside the farm boundary

What data is used?	3. Own / Local Database Values	

Included Activities / Emissions

N_2O emissions from soil (§5.2.3)	1. Yes	
CO_2 emissions from lime use on soils	1. Yes	
Fuel and energy use	1. Yes	
Production of fertilisers	1. Yes	
Emissions from peat soils (§5.5.4)	3. Not Relevant	*Provide evidence supporting omitting this element*
Capital goods	3. Not Relevant	*Including emissions associated with Capital Goods is optional*
Transportation of feed to farm	1. Yes	
Land use change… (§5.5.1)	1. Yes - Included as a separate value	
Harvesting loss and crop residue emissions	1. Yes	

What co-product allocation method has been used? (§5.4.1)	2. Economic	
What GWP100 conversion factors have been used? (§6.1)	AR5 incl. ccfb (CH4=34 & N2O=298)	*Switching to AR6 values will result in a slightly lower impact of*

Use the area below for any additional comments or notes relating to emissions associated with **Imported Feed**

Purchased feed emissions factors currently only available in AR5, from Foods3 and a byproduct LCA.

Are emissions associated with **Imported Animals** included? 2. Yes - Footprint of incoming animals captured

This includes ANY purchased animals or replacements reared off the farm

What data is used? 3. Own / Local Database Values

Included Activities / Emissions

Enteric Fermentation (§5.2.1)	1. Yes	
Manure Management (§5.2.2)	1. Yes	
Feed Production (§5.2.4)	1. Yes	
Emissions from Peat Soils (§5.5.4)	3. Not Relevant	*Provide evidence supporting omitting this element*
Land Use Change (§5.5.1)	1. Yes	
Transport to Farm	2. No	*This element is required unless there is evidence it is not releva*

What GWP100 conversion factors have been used? (§6.1) AR6 (CH4=27 & N2O=273)

Use the area below for any additional comments or notes relating to emissions associated with **Imported Animals**

LUC is assumed to refer to those associated with feed production

Are emissions of **Cattle Off Farm** included? 2. Yes - Footprint of animals off-farm captured

This is to ensure the emissions associated with any stock spending time off the farm (e.g. dry cattle managed elsewhere) are still captured in the analysis

What data is used? 3. Own / Local Database Values

Included Activities / Emissions

Enteric Fermentation (§5.2.1)	1. Yes	
Manure Management (§5.2.2)	1. Yes	
Feed Production (incl fertiliser, harvesting etc...) (§5.2.4)	1. Yes	
Emissions from Peat Soils (§5.5.4)	3. Not Relevant	*Provide evidence supporting omitting this element*
Land Use Change (§5.5.1)	1. Yes	
Transport from and to Farm	2. No	*This element is required unless there is evidence it is not releva*

What GWP100 conversion factors have been used? (§6.1) AR6 (CH4=27 & N2O=273)

Use the area below for any additional comments or notes relating to emissions associated with **Cattle Off Farm**

LUC is assumed to refer to those associated with feed production

Are emissions of **Imported Bedding Materials** included? 3. Not Relevant *Provide evidence supporting omitting this element*

e.g. straw, sawdust or other materials imported as bedding

Use the area below for any additional comments or notes relating to emissions associated with **Imported Bedding Materials**

Miniscule portion of footprint. Bedding is included as part of the manure emissions, but does not include upstream

Are **Energy and Milking Parlour Emissions** included? 1. Yes

Emissions associated with milking and the storage of milk prior to collection

What data is used? 5. Combination of Primary and Secondary Data

Included Activities / Emissions

Refrigerant Losses (§5.2.4)	2. No	*This element is required unless there is evidence it is not releva*
Capital goods	3. Not Relevant	*Including emissions associated with Capital Goods is optional*
Electricity (§5.3.1)	2. Yes - Location based	

Use the area below for any additional comments or notes relating to **Energy and Milking Parlour Emissions**

Summary for on farm components

Area	Number of issues	Data Source
Absence of Major Components	1	
Milk / Liveweight Allocation	0	
Enteric Emissions	0	
Manure Management	0	
Homegrown Feed Production	2	
Peat Soils	Absent	
Imported Feed	1	
Imported Animals	1	
Cattle Off Farm	1	
Imported Bedding Materials	Absent	
Energy and Milking Parlour Emissions	1	