Cornell University NMSP Nutrient Management Spear Program

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Nutrient Mass Balance Calculator Input Sheet

N, P and K imports and exports: 1/1/2025 to 12/31/2025

Producer Contact Information		**Data Collection**	
Producer name		By	
Farm name		Email	
Address			
County and State			
Phone			
E-mail		Balance year	2025

Farm Information		**Watershed**	
Total farm acres		Primary watershed	
All tillable owned and rented crop and pasture acres		Secondary watershed	
Legume acres (perennial and annual) >10% legume		**Soil Type**	
Acres receiving manure (crop and pasture)		Primary soil type	
Milk marketing co-operative		Secondary soil type	

Have you completed a Cornell Dairy Farm Business Summary (DFBS) for the balance year?	☐
Have you completed a Farm Credit Business Summary for the balance year?	☐
Are you a Certified Organic producer?	☐
Intensive grazing (grazed at least 3 months/yr, moved to a new pen every 3 days or more)?	☐
Do you have a Comprehensive Nutrient Management Plan (CNMP) for the balance year?	☐
Do you have a Cropware plan for the balance year?	☐
Did you complete the Dairy Profit Monitor for the balance year?	☐

Average number and weight of farm livestock				**If animals are raise off farm:**				***GHGs only***
Animal Group		**Number**	**Weight (lbs/head)**	**Period of time**	**Number**	**Do you: (Y/N)**		
						Supply feed?	**Handle manure?**	**Max pen stocking density (%)**
Cattle	Lactating cows					☐	☐	
	Dry cows					☐	☐	
	Heifers: breeding to calving					☐	☐	
	Heifers: weaning to breeding					☐	☐	
	Calves					☐	☐	
	Bulls and steers					☐	☐	
Other livestock					**Dairy cow breed(s)**			
					Cull rate (%)			
					Average SCC			
					Notes:			

FARM CROP PRODUCTION															Inventory (as fed tons)	
Crop name and type*	% legume	Area (acres)	Approx. planting date	Approx. harvest date	Manure applied?	Corn grain: Stover removed?	CP (% DM)	P (% DM)	K (%DM)	% NDF	Yield (t/a)	DM (%)	Any crop sold?	Beginning year	Ending year
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		
					☐	☐							☐		

* Crop type = “Forage”, “Grain” or “Bedding”, "Cover crop", "Other"

*GHGs only**					
Crop name**	Total Amount Fed	CP (% DM)	% NDF	DM (%)	Feed given to:
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%
					Lactating ________% Dry ________% Heifers: breeding to calving ________% Heifers: weaning to breeding ________% Calves ________% Other ________%

* Representative diets may also be submitted

** Please input homegrown feed data fed for the assessment year

IMPORTS

Feeds (purchased)	Tons/ year	% DM	CP (%DM)	P (%DM)	K (%DM)	*GHGs only* % NDF	Distance transported/ purchase location	% of import fed to each group*
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
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								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%

* Representative diets may also be submitted

						GHGs only		
Feeds (purchased)	Tons/ year	% DM	CP (%DM)	P (%DM)	K (%DM)	% NDF	Distance transported/ purchase location	% of import fed to each group*
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%
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								Lactating ______% Dry ______% Heifers 1-2yr _____% Heifers <1yr ______% Calves ______% Other ______%

GHGs only	
Feed Additives	**Amount fed (grams/lactating cow/day)**
Monensin/Rumensin	
3-NOP	
Other (specify): ____________________	

					GHGs only
Purchased fertilizers	**Tons/year**	**% N**	**% P_2O_5**	**% K_2O**	**Distance transported/ purchase location**
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	
		%	%	%	

					GHGs only
Purchased animals	**Type***	**Description**	**Number**	**Weight/hd (lbs)**	**Distance transported/ purchase location**

* Type = “Dairy”, “Beef”, “Swine”, “Poultry”, “Goats”, “Sheep” or “Horses”

								GHGs only
Purchased bedding, manure and miscellaneous imports	**Amount**	**Units***	**% DM (% solids)**	**N**	**P**	**K**	**Units** (as sampled)**	**Distance transported/ Purchase location**

* Units = “tons/year”, “gallons/year”, “yards/year”,

** Units = “%”, “lbs/ton” or “lbs/1000 gallons”

EXPORTS

Milk sold (lbs/year)	Milk protein (%)	Milk fat (%)	Milk urea nitrogen (MUN) (mg/dl)

GHGs only			
Milking Information		**Distance to Milking Parlor**	
Milkings per day		**Vertical distance**	
Time out of pen/milking		**Horizontal distance**	

Animals sold	Type*	Description	Number	Weight/hd (lbs)

* Type = “Dairy”, “Beef”, “Swine”, “Poultry”, “Goats”, “Sheep” or “Horses”
List cull cows and bull calves as “Dairy”
List deceased animals (animals deceased on-farm) as “Deceased”

Crops sold	Tons/year	%DM	CP (%DM)	P (%DM)	K (%DM)	Feed type*	
TMR							**% forage**

* Feed type = “Grain”, “Forage” or “TMR”

Exported manure, compost and other exports	Amount	Units*	% solids	N	P	K	Units** (as sampled)

* Units = “tons/year”, “gallons/year”, “%”

** Units = “%”, “lbs/ton” or “lbs/1000 gallons” A manure analysis can be attached if this is easier

GHGs only						
Manure storage *	**% solids**	**Total N**	**Ammonium N**	**P_2O_5**	**K_2O**	**Units* (as sampled)**

* A manure analysis can be submitted.

** Units = “%”, “lbs/ton” or “lbs/1000 gallons”

GHGs only						
Manure applications						
Crop applied to	**Acres applied to**	**Manure storage**	**Application rate***	**Units****	**Application method*****	**Timing********

GHGs only									
Fertilizer applications									
% N	**% P_2O_5**	**% K_2O**	**Crop applied to**	**Acres applied to**	**Rate***	**Units****	**Application method*****	**Timing********	**Protected N source?********* State type**

An <u>updated</u> nutrient management plan with <u>actual</u> manure and/or fertilizer applications can be submitted.

* Application rate = total applied to crop, or amount/acre

** Units = "tons", "kgal", "lbs/acre", "gal/acre"

*** Application method = "Broadcast/surface applied/No incorporation", "Incorporated within 24 hours", "Injected/subsurface"

**** Timing = "Spring", "Summer", "Fall", "Winter", “Planting”, “Sidedress”

***** Enhanced efficiency fertilizer, e.g. nitrification inhibitors, urease inhibitors, slow release fertilizer

GHGs only									
Crop rotation 1					**Total acres:**				
Year of rotation	**Crop**	**Most intensive tillage practice***	**Tillage method**	**% Cover cropped**	**Cover crop type**	**Cover crop height**	**Cover crop cover**	**Termination date (approx.)**	**Termination method**
1									
2									
3									
4									
5									
6									
7									
8									
9									

GHGs only									
Crop rotation 2**					**Total acres:**				
Year of rotation	**Crop**	**Most intensive tillage practice***	**Tillage method**	**% Cover cropped**	**Cover crop type**	**Cover crop height**	**Cover crop cover**	**Termination date (approx.)**	**Termination method**
1									
2									
3									
4									
5									
6									
7									
8									
9									

* Tillage practices = "conventional", "reduced" or "no till"

** Please fill out if multiple crop rotations

GHGs only		
Land use change in the last 20 years		
Previous land use*	**Current land use****	**Number of acres**

* Previous land use: "Woodland/forest", "Cropland", "Permanent grassland/pasture/rangeland"

** Current land use: "Woodland/forest", "Cropland", "Permanent grassland/pasture/rangeland"

GHGs only				
Energy and fuel use				
Source	**Amount used**	**Amount Exported**	**Units**	**% used for dairy activites***
Electricity (grid)				
Electricity (solar)				
Electricity (wind)				
Electricity (hydro)				
Gasoline				
Diesel				
Natural gas				
Heating oil				
Propane				
Other (_____ _____ _____)				
Other (_____ _____ _____)				

*The approximate % of each energy type used strictly for dairy operations (cropping, barns, parlor, equipment etc). Non-dairy energy usage include household and personal energy use. Fuel use for spreading manure is not included in dairy activities energy usage.

Manure Management 1

Animal category	Number of animals	Do animals graze?	% of animals grazing	Grazing hours per year	Grazing hours per day	Comments
Lactating cows		☐				
Dry cows		☐				
Heifers: breeding to first calving		☐				
Heifers: weaning to breeding		☐				
Calves (pre-weaning)		☐				

For how many months of the year is this pen used? If pen is used year-round, leave blank.

Comment:

Manure Management 1: Pen management details

Pen type (select one)		Pen cleaning method		Pen bedding information			Comments:
Tiestall	☐	Manual scraping	☐	Bedding type	Amount	Units	
Freestall	☐	Automatic alley scraper	☐				
Open lot	☐	Flush system	☐				
Bedded pack	☐	Pen cleaning frequency:					
Calf hutch	☐						
Other (specify):							

Manure Management 1: Storage details

Manure treatment and storage		Order (if appicable)	Removal/emptying frequency:	Comment:
Liquid manure storage, no cover	☐			
Liquid manure storage, natural crust cover	☐			
Liquid manure storage, synthetic cover and flare	☐			
Solid storage	☐			
Daily spread	☐			
Composting	☐		☐ Static pile ☐ Active windrow ☐ Passive windrow	
Solid/liquid separation	☐		Type: Solids: ☐ Bedding ☐ Exported ☐ Spread ☐ Composted	
Anaerobic digester	☐		Type: Age: years Post-digestion separation? ☐	Effluent management:
Other (specify):				

Which manure treatment/storage does the milking parlor waste go into?

Comments:

Manure grouping guidelines

The pens on your farm can be condensed into "groups" and reported on the group sheet, rather than reporting information for each pen individually. Multiple pens may be condensed into a single group sheet *if the pens meet all of the following criteria*:

1. The pens are of the **same type** (freestall, tiestall, open lot, etc.).
2. Animals in these pens have the **same grazing management, if applicable** (days with grazing access and hours per day on pasture).
3. Pens are bedded with the **same type of bedding**; however, the rate of bedding use (e.g., 1 ton of sawdust per week) can differ.
4. **Manure** from the pens is **managed in the same way**, e.g., you cannot combine two lactating pens where one pen's manure is daily spread, and the other goes to liquid storage.

In other words, if the responses on the group sheet are *the same for multiple pens,* you can combine those pens into a single group sheet (just remember to update animal totals!)

Example: A barn contains 6 pens:

Pen name	Pen type	Animal type	Bedding	Manure
Transition pen	Deep-bedded pack	Lactating	Sawdust; 1 ton/month	Scraped out to compost
High lactating	Freestall	Lactating	Sand	Flushed to slurry storage
Late lactating	Freestall	Lactating	Sand	Flushed to slurry storage
Hospital pen	Deep-bedded pack	Lactating	Sawdust; 2 tons/month	Scraped out to compost
Bred heifer pen	Freestall	Heifers >1 year old	Sand	Flushed to slurry storage

The transition pen and hospital pen can be combined into one pen sheet, and the high and late lactating pens and heifer pen can be combined into one pen sheet. All four lactating pens cannot be combined into one sheet because they have different beddings and different manure management. The number of lactating cows vs. heifers in the combined pen sheet would need to be indicated.

Group sheet instructions

Complete as many "group sheets" as needed based on the guidelines above.

A. Typical number of animals: Provide the typical or average number of animals housed in this pen. If more than one life stage type is reflected, please ensure you indicate the number of animals of each life stage in this box (e.g. 150 heifers and 50 dry cows).

   a. **% of animals grazing:** For each life stage in the group, please provide either the number or percent of animals that have grazing access (e.g. a group has 200 heifers, and 100 of them have grazing access; 50% of heifers in this group).
   b. **Grazing days per year:** For each life stage in the group, specify how many days of the year these animals have grazing access.
   c. **Grazing hours/day:** For each life stage in the group, specify how many hours of the day that animals have grazing access during the grazing season.

B. Pen management details:

   a. Select the pen type that animals are housed in.
   b. Select how manure is cleaned from this pen. You may select more than one if needed. Manual scraping includes use of a skid steer.
   c. Enter the cleaning frequency of the pen.
   d. Select the bedding type used in this pen. In the comment box, please indicate the bedding use rate (bedding mass used per animal, per day, annually, etc.) if possible. You may also provide this

information in terms of bedding inventory allocation, e.g., of my annual purchased sand, I estimate 60% of that sand is used to bed this group. If more than one type of bedding is used, please indicate in the comment box how the multiple bedding types are used, e.g., straw for 4 months in winter, sawdust for the rest of the year

C. Manure treatment/storage: Select the manure treatment and/or storage that manure from this pen is moved to. In the comment box, indicate the name/ID of the storage, matching what you entered on page 7. This is done in order to quantify how manure from multiple group sheets is aggregated into one or more manure storages. If manure goes through multiple stages, label them in order.

- **1**: For solid liquid separation, please select this option only for mechanical-type separators, e.g., screw press, roller press, centrifuge, etc. In the 'Solid/liquid separation type' column, please indicate the type of separator. If you have information on the solid removal rate for your separator, please also include this. Lastly, please indicate whether separated solids are exported (e.g. sold), composted, field-applied, or recycled as bedding.
- **2**: For anaerobic digestion, please indicate in the comment box **what type of digester** (continuous stirred tank reactor, plug flow, covered anaerobic lagoon, etc.), and the **approximate age of the digester** in years.
- **3**. If manure goes through multiple manure handling/storage types, enter the order in which manure passes through the system. For example, if manure is separated and then enters a digester, type '1' in the Order column next to solid/liquid separation, and 2 in the column next to Anaerobic digester.
- **4**: If only some of the manure goes through the separator or digester (for example), make a note.

Manure treatment/storage:	Removal/emptying timing:	Comment:
☒ Liquid manure storage, no cover – *stage 1, 30% + stage 3 (from digester)*	*Pumpdown in April and October*	
☐ Liquid manure storage, cover		
☐ Liquid manure storage, cover and flare		
☐ Solid storage		
☐ Daily spread	N/A	
☐ Composting		Static Active windrow Passive windrow
☒ Solid/liquid separation – *stage 1, 70%*	N/A	Type: *Screw Press* Solids: ☐Exported ☐Composted
☒ Anaerobic digester – *stage 2*		Age: *3yrs* Type: *CSTR*
☐ Other (specify):_____		

D. Removal: For the corresponding manure storage in box I, please indicate *when* during the calendar year manure is removed. E.g., a liquid storage is pumped down and field applied every 365 days on approximately May 1st; a liquid storage is pumped down every 6 months, on April 1st and October 1st; solid manure stacks are field applied every 3 months; compost is exported (sold) annually.