

Cornell Nutrient Management Spear Program
Whole Farm Nutrient Mass Balance Input Form Instructions
December 15, 2023

INTRODUCTION

The purpose of this input form is to collect the necessary data for developing a whole-farm nutrient mass balance. This form can be used to develop a nutrient mass balance for any type of livestock operation (dairy, swine, poultry, etc.), or for non-livestock farms. For non-livestock farms, ignore all questions concerning animals. Send completed form to: Quirine Ketterings, 323 Morrison Hall, Cornell University, Ithaca, NY, 14853. FAX: 607 255-9829 Attn: Quirine Ketterings. Email: qmk2@cornell.edu.

FARM CHARACTERISTICS

Producer Contact Information:

Record the producer contact information, including address, county, phone, and email (if available).

Data Collection:

Enter the name and email address of the CCE or agency professional collecting the data (if applicable). Enter data for the calendar year January 1, 2022 to December 31, 2022.

Watershed:

Enter the watershed where most of the farm-owned and rented land is located, in the “Primary” box (see the map below). If the farm is in two watersheds, enter the watershed that has the smaller farm area in the “Secondary” box.



Soil Type:

Enter the predominant soil type of the farm owned and rented land in the "Primary" box. If there are multiple soil types, enter the soil type with the largest farm area in the "Primary" box, and the soil type with the second largest farm area in the "Secondary" box.

Farm Information:

Total farm acres: Enter the total owned and rented farm acres (including buildings and woodlands).

All legume and non-legume tillable crop and pasture acres: Enter the total number of crop and potentially tillable pasture acres owned and rented.

Legume acres (perennial and annual) >10% legume: Enter all crop and tillable pasture acres, both annual and perennial that have more than 10% legume plant content.

Acres receiving manure (crop and pasture): Enter the total number of acres owned and rented that receive manure either by mechanical spreading and/or animal grazing.

Milk marketing co-operative: Enter the milk marketing co-operative that you belong to (*optional*).

Check the boxes to indicate "yes" in answer to the questions concerning the Cornell Dairy Farm Business Summary, the Farm Credit Business Summary, organic certification, intensive grazing, having a Comprehensive Nutrient Management Plan (CNMP), and having a Cropware Plan. If raising heifers off-farm, check the box and specify the age group of the heifers that are raised off-farm.

Animal Information:

Enter the average number and weight per head of animals on the farm during the balance year. On dairy and beef farms, group all mature cows (milking and dry) on the first line. These are cows that have freshened one or more times. On dairy farms, enter the main dairy cow breed, or breeds, the cow cull rate, and the average somatic cell count (SCC) for the year.

FARM CROP PRODUCTION

Enter all crop and pasture production. Include crops grown for feed and for off-farm sale. Enter the percent legume in the stand. If a legume % greater than 0 is entered, check the box if manure was also spread (mechanically or by grazing livestock) on the same acreage. Enter the number of acres, the crude protein (CP), phosphorus (P) and potassium (K) content of the harvested crop (% dry matter). Select "Forage", "Grain", or "Bedding" to describe the harvested crop. If you choose to enter the yield and inventory balances as dry matter, you can enter 100% in the DM% cell. If you enter the yield per acre and inventories in as-fed tons, enter the harvested crop dry matter content as a percentage. If there is a change in the beginning and ending calendar year inventory of a crop produced for feed or sale, record the beginning and ending year inventory. Enter the average yield in tons (dry matter or as-fed, as selected in the previous column) per acre. If you enter the yield on a dry matter basis, also enter beginning and ending year inventories on a dry matter basis. If you entered the yield on an as-fed basis, enter the inventory on the same as-fed basis.

NUTRIENT IMPORTS

Feeds Purchased:

Enter the type of feed, tons purchased per year, and the percentages of dry matter, crude protein, P, and K. Select the feed type: "Grain", "Forage", or "TMR". The "% forage" is only entered when TMR is selected. If there is a change in the beginning and ending calendar year purchased feed inventory, record the beginning and ending year inventory in tons as-fed.

Purchased fertilizers:

Enter the fertilizer type, tons purchased per year, and the percentages of N, P₂O₅, and K₂O.

Purchased animals:

Enter the number of adults and young stock purchased, and the average weight per head in lbs.

Bedding, manure and miscellaneous imports:

Enter the number of tons, percent dry matter, N, P, and K (% dry matter) for all bedding material purchased, and manure or other miscellaneous imports. Do not enter farm produced bedding. For manure imports, enter the quantity as tons per year or gallons per year, and % solids. Enter the N, P and K as sampled as this is the format commonly used to report compost and manure analyses. Enter the units that the manure analysis is reported as (% , lbs per ton, or lbs per 1000 gallons).

NUTRIENT EXPORTS

Milk sold:

Enter the annual total amount of milk sold (in lbs), the average percent milk protein, average percent milk fat, and average milk urea nitrogen (MUN), as reported on the milk check.

Animals exported:

Enter the number and average live weight per head of all animals sold or exported from the farm.

Crops sold:

Enter the type of crop sold, its quantity, and the percentages of dry matter, crude protein (% dry matter), P (% dry matter), and K (% dry matter). If a total mixed ration is sold, enter the proportion of the mix which is forage.

Manure, compost, and other exports:

Record any other significant products that were sold or given away, such as manure, compost, etc. Enter the quantity, and % solids. Enter the N, P and K as sampled as this is the format commonly used to report compost and manure analyses. Enter the units that the manure analysis is reported as (% , lbs per ton, or lbs per 1000 gallons).

SUPPLEMENTAL INFORMATION

How data are collected:

Enter how data for crop yields, crop nutrient values, and manure nutrient values are collected or estimated.

ADDITIONAL INFORMATION FOR GREENHOUSE GAS ESTIMATION

If you are interested in calculating the greenhouse gas emissions (sometimes referred to as carbon footprint) for your farm, please complete the following information. A second report will be provided with estimates of the carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) emissions from your farm, the source of these emissions (e.g. crop production, manure management), and potential opportunities to reduce emissions on your farm. As we collect more data on greenhouse gas emissions, we aim to identify “win-win” farm management opportunities that will help to lower both nutrient balances and greenhouse gas emissions without negative impacts on production or economics of the farm.

Grazing

For each animal category, please specify the average number of animals that have access to grazing, the average number of days per year they have access to grazing, and the average number of hours per day they have access to grazing. For example, if lactating cows are allowed access to grazing, exclude the time they are moving to the parlor and are in the parlor for milking from the time at grazing.

Manure storage/treatment facility:

For each animal category, estimate the % of that animal category’s manure entering each storage or treatment

facility on the farm during their indoor period. Do not include any manure produced by animals during grazing periods. Each column/animal category should add up to 100%.

Manure analysis:

If available, please submit a copy of any manure analyses you have. If you are unable to submit a copy of the analysis, enter the total N, inorganic/ammonium N, P and K content of manure used on farm as sampled, as this is the format commonly used to report compost and manure analyses. Enter the units that the manure analysis is reported as (e.g. %, lbs per ton, or lbs per 1000 gallons).

Describe a typical crop rotation for your farm

State the typical crop rotation.

Manure applications

For each crop, provide details on the manure applications received, including the manure storage, the application rate (either total applied to all fields for that crop, or an average application rate per acre), the application method (“broadcast/surface applied/not incorporated”, “incorporated within 24 hours” or “injected”), and the timing (“Spring”, “Summer”, “Fall”, “Winter”). If multiple storages, methods, or timings are used for a specific crop, enter each one on a different row. This will result in multiple rows for that crop. If you have an updated nutrient management plan with actual application rates you can submit this and we can calculate the applications for you.

Fertilizer application:

For each crop, provide details on the purchased fertilizer applications received, including the %N, %P₂O₅ and %K₂O, the application rate (either total applied to all fields for that crop, or an average application rate per acre), and the application method “broadcast/surface applied/not incorporated”, “incorporated within 24 hours” or “injected/subsurface”). If multiple fertilizers, methods, or timings are used for a specific crop, enter each one on a different row. This will result in multiple rows for that crop. If you have an updated nutrient management plan with actual application rates you can submit this and we can calculate the applications for you. If an enhanced efficiency fertilizer, or protected N source is used, specify the type, e.g. nitrification inhibitor, urease inhibitor, slow release fertilizer. Product name can be specified if type is unknown. If you have an updated nutrient management plan with actual application rates you can submit this and we can calculate the applications.

Tillage practices

For each crop grown on your farm, state the most intensive tillage practice from “conventional”, “reduced” or “no till”. If tillage practices have changed within the last 20 years, state what the previous tillage practice was from “conventional”, “reduced” or “no till”. If first year corn receives different tillage intensity to following years, enter this as a separate row.

Cover crops

Enter the percentage of corn acres that were cover cropped in the current year.

Land use change

Indicate any land use change that has occurred on the farm in the last 20 years. Land uses are classified as “Woodland/forest”, “Crop production”, “Permanent pasture/grazing/rangeland”.

Energy and fuel use

State all energy and fuel used for field and farm activities. Include any fuel used by contractors, and energy generated on farm.

Transport

For all products imported onto the farm (e.g. feed, fertilizer), state the distance between the point of purchase and the farm, or location of point of purchase. E.g., from the feed merchant to your farm for purchased feeds.