



## Nutrient Mass Balance Software

### Introduction

For the sustainability of the dairy sector in New York State, it is important to find ways to enhance profitability while minimizing environmental loss of nitrogen (N) and phosphorus (P). This requires farms to maintain sustainable whole-farm nutrient mass balances. A nutrient mass balance (NMB) is defined as the difference between the amount of N, P, and potassium (K) imported through purchased feed, fertilizer, animals and bedding or manure, and the amounts exported off the farm via milk, meat, crops, manure and/or compost (Figure 1). Such assessments can help identify management alternatives that can enhance whole farm nutrient use efficiency (and hence reduce nutrient losses) and increase farm profitability.

In this agronomy fact sheet we describe how to use the Mass Nutrient Balance software to derive a farm's N, P and K balance.

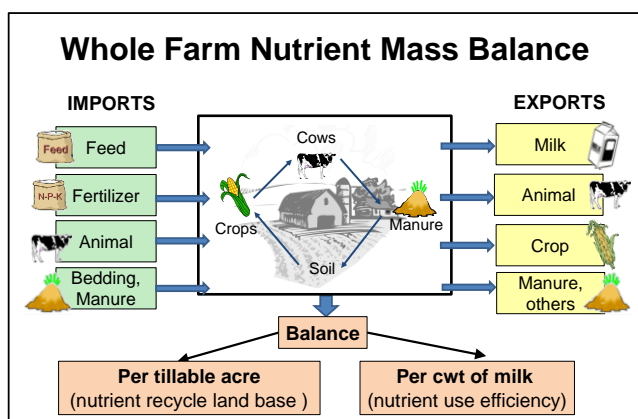


Figure 1: A farm mass nutrient balance is the difference between nutrient (N, P, and K) imports and exports.

### What Can Nutrient Mass Balance Do?

A Nutrient Mass Balance analysis helps farm managers determine where the greatest nutrient use inefficiencies occur. A software program ("Nutrient Mass Balance") was developed to allow users to:

- Calculate the amount of nutrients being imported, exported, and recycled through the production of pasture and crops.

- Calculate the amount of nutrients being imported to the farm in the form of purchased feeds (i.e. not homegrown), fertilizers, animals, and bedding material.
- Calculate the amount of nutrients being exported from the farm in the form of products sold including, feed, milk, animals, crops, and manure/compost.
- Generate reports that show farm N, P and K imports and exports in tons for the whole farm, in pounds per acre cropland, per pound of product sold, or per animal unit.
- Identify areas of concern and opportunities for more efficient nutrient use that, if addressed, could increase profitability and reduce environmental impact.

### Where Do I Start?

*Step 1: Obtain the Nutrient Mass Balance Input Data Form.*

- This form (four pages) can be downloaded from the Mass Nutrient Balance webpage of the Nutrient Management Spear Program: [http://nmsp.cals.cornell.edu/projects/mass\\_balance.html](http://nmsp.cals.cornell.edu/projects/mass_balance.html).

*Step 2: Record Keeping.*

- Throughout the year, keep records of the quantities of feed, fertilizer and other materials purchased as identified in the Input Data Form. The record keeping booklet is designed to help with this too.

*Step 3: Fill out the Input Data Form.*

- Print the Input Data Form from the Nutrient Management Spear Program website.
- At the top of the sheet, write down the producer and farm information including the number of farm tillable acres (owned and rented) and animals.
- Fill out the Crop production section including farm-produced crops and pasture. Forage analyses are helpful to obtain accurate values for crude protein, P and K.
- Fill out the Imports section which includes all feeds, fertilizers, animals, and bedding purchased or brought onto the farm. Forage

analyses are also helpful for this section. If feed composition values are not available from farm analysis or from feed companies and nutritionists, the software provides standard, "book values" for common feeds.

- Fill out the Exports section which includes any crops, milk, animals, and manure or compost that is sold or moved off the farm.

*Step 4: Download the Nutrient Mass Balance Calculator and Install*

- This software requires Windows XP or later and at least 5 Mb of storage.
- Download free of charge from: [http://nmisp.cals.cornell.edu/projects/mass\\_balance.html](http://nmisp.cals.cornell.edu/projects/mass_balance.html). After clicking on "Download the Nutrient Mass Balance Calculator", click "run" and follow the on-screen instructions. The program installation will place the program name in your Start menu.

*Step 5: Fill out the Whole Farm Nutrient Balance Spreadsheet.*

- Click on "Start Program" to see the screen below (Figure 2).
- For additional help, download the Help file, accessible at the same project website.

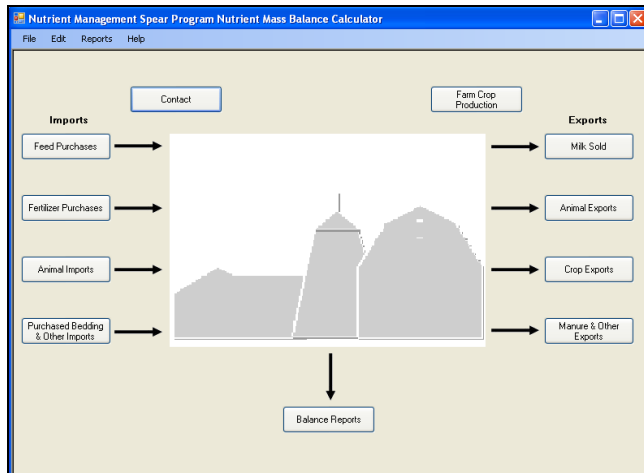


Figure 2: Nutrient Balance Mass program Menu. Imports buttons are on the left, export buttons on the right.

- Click on the Contact button and enter the contact information from the completed Data Input Form into the appropriate fields.
- Click Next to go to the next input screen, Farm Crop Production.
- In the Farm Crop Production Screen enter the appropriate crop production information from the Data Input Form. Remember to enter crop and pasture production on rented as well as owned land.

- Continue to transfer the information from the Input Form to the import and export sites of the software.
- When you are finished with entering all the information from the Data Input Form, click on "Home" to return to the main menu. Click on the Balance Reports button to see the results of your mass balance assessment.
- Data are automatically saved as you move from one data entry field to the next.
- You can save your data into a format to send to the Nutrient Management Spear Program (NMSP) to obtain a comparison between your farm and all farms in the database to date by choosing "Export Data for Cornell" in the File drop down menu at the top of the screen. You must then attach the resulting file ("your farm name\_balance\_year.zip") to an email and send it to [qmk2@cornell.edu](mailto:qmk2@cornell.edu). All Nutrient Mass Balance data/results are kept strictly confidential. In your farm comparison report, your farm will be one of many data points on the charts.

**For Support and/or Training**

If you need help transferring your information from the Data Input Form into the software, send the completed Data Input Form to Quirine Ketterings, Nutrient Management Spear Program, 323 Morrison Hall, Cornell University 14853. For further information, contact Quirine Ketterings ([qmk2@cornell.edu](mailto:qmk2@cornell.edu) or 607 255-3061).

**Disclaimer**

This fact sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this fact sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information



**Cornell University  
Cooperative Extension**

Nutrient Management Spear Program  
<http://nmisp.cals.cornell.edu>

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2015 (updated from 2010)