Value of Manure Calculator User's Guide

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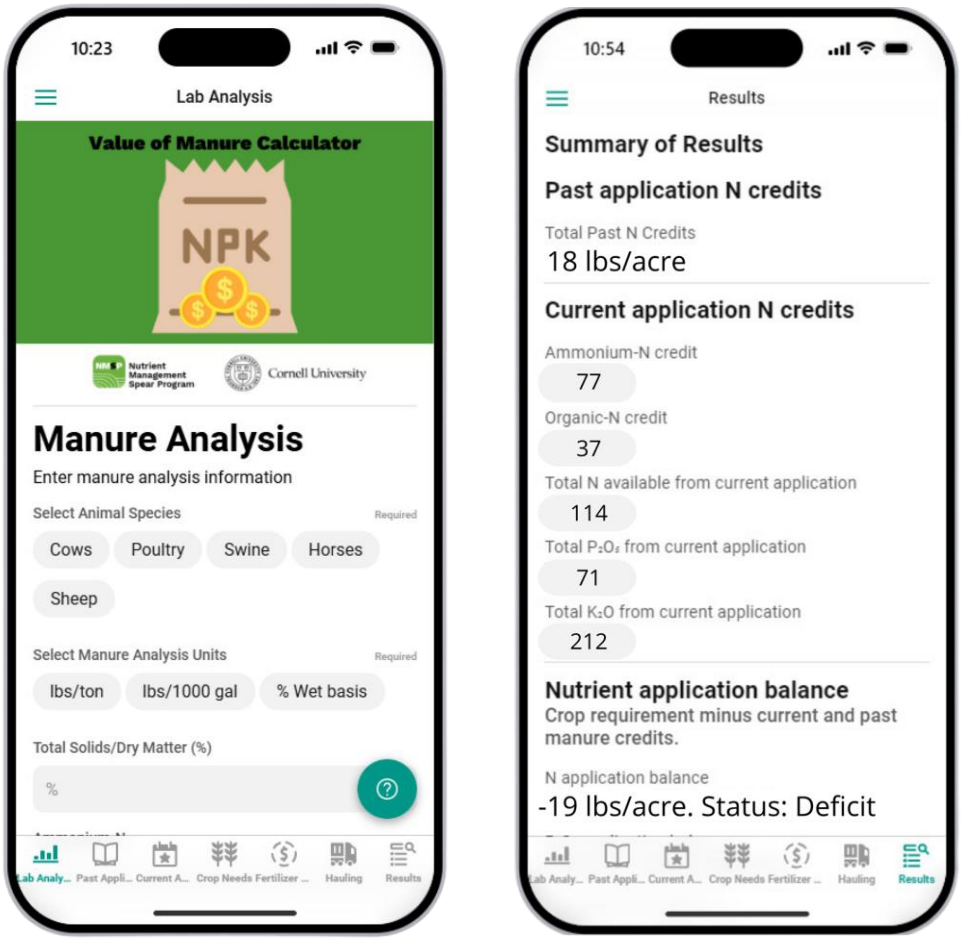

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Executive Summary

- Quantification of nutrients in manure is essential from an economic and environmental perspective to ensure efficient resource management, maximize agricultural productivity, and minimize negative environmental impact.
- To estimate the agronomic and economic (savings on commercial fertilizers) value of manure, the Value of Manure Calculator (https://valueofmanure-nmsp.glideapp.io/) was developed.
- This user-friendly app has been designed to estimate nitrogen (N), phosphorus (P) and potassium (K) credits from various manure sources, based on results of a manure analysis (user input) and user-defined application rate, method, and timing.
- Users will need to know their manure nutrient content from a recent manure analysis, application rates, crop nutrient needs, and fertilizer costs to get the most useful results from the calculator.
- This app uses nitrogen credits that are in line with Cornell's Nitrogen Guidelines for Field Crops in New York (2023). If you are in another state, you should consult your local land grant university guidance for manure N credits.
- This User's Guide explains how to access and use the calculator.

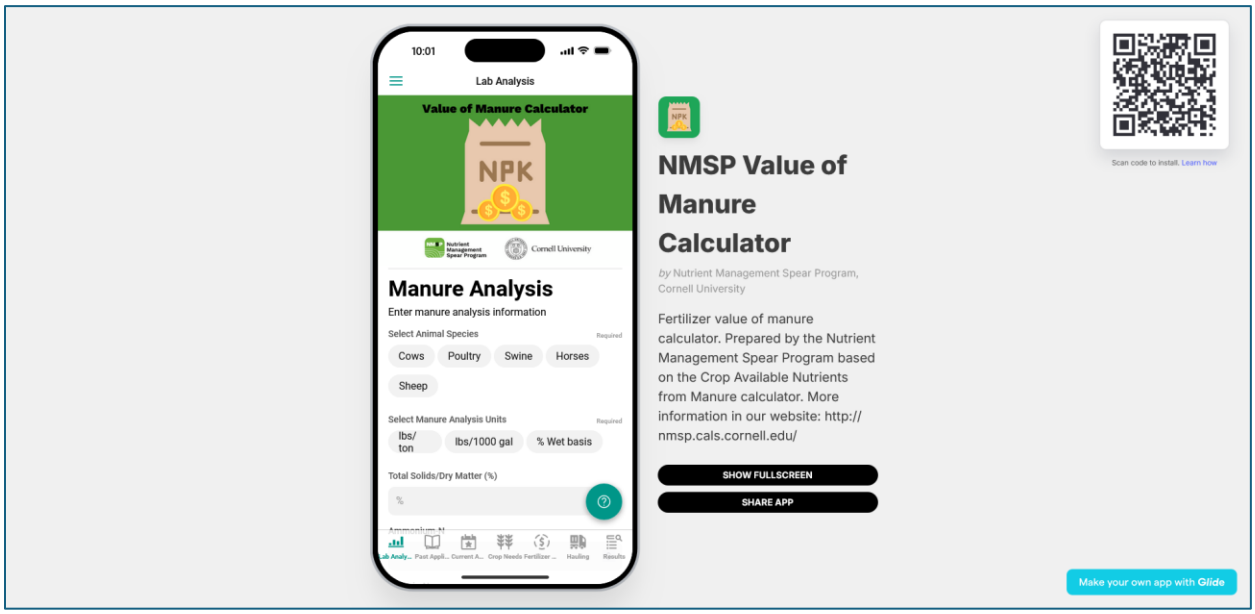
Acknowledgments

The original manure crediting system was developed based on many years of field research under leadership of S.D. Klausner, with contributions by D.J. Lathwell, D.R. Bouldin, and W.S. Reid of Cornell University, Department of Crop and Soil Sciences. This app was developed with the financial support from the Northern New York Agricultural Development Program, the New York Agricultural Viability Institute, and federal formula funds.

Table of Contents

1. Accessing the Value of Manure App

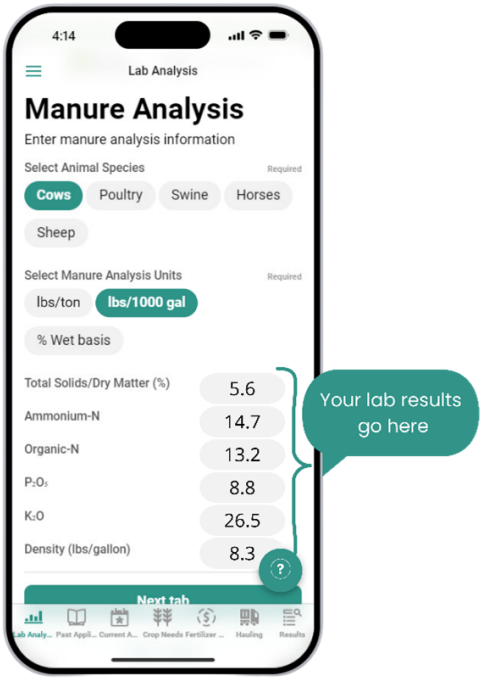
The Value of Manure app is a Glide app that can be accessed at [Value of Manure Calculator (https://valueofmanure-nmsp.glideapp.io/)](https://valueofmanure-nmsp.glideapp.io/) with any browser or by scanning the QR code to the right. Once opened, the user will see the opening page of the calculator as shown below. The front page shows, at the bottom, seven tabs: Lab Analyses; Past Application; Current Application; Crop Needs; Fertilizer Value; Hauling; and Results. Upon opening the app, the Lab Analyses tap will be displayed as shown below.



2. Entering a Manure Analysis

The user enters values from laboratory nutrient analysis report from the manure source in Lab Analyses tab. The data will be used in the subsequent tabs for nutrient credit calculations. Manure analyses can be entered by first selecting the animal species (cows, poultry, swine, horses, sheep), then selecting the units (lbs/ton, lbs/1000 gallons/ % wet basis), followed by entering the nutrient analyses from the laboratory report:

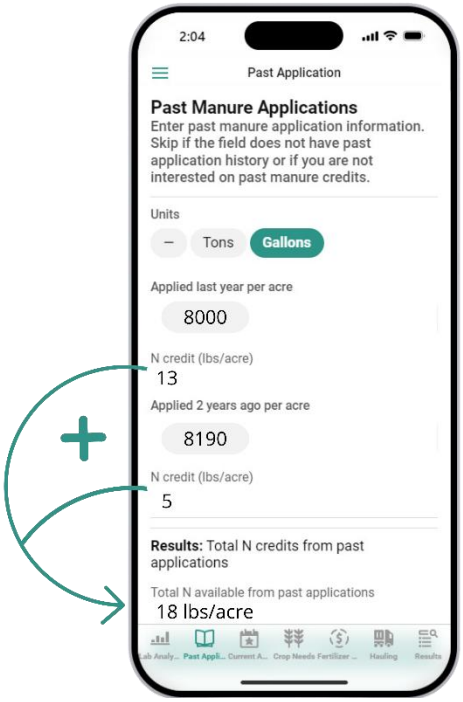
- Total solids or dry matter should be entered as a percentage on a wet basis (as-is).
- Solid manure nutrients are usually reported in pounds/ton while liquid manure is typically entered in lbs/1000 gallons.
- Density is entered in lbs/gallon. Liquid manure typically has a density that varies between 8 and 9 lbs/gallon. The density of water is 8.3 lbs/gallon.



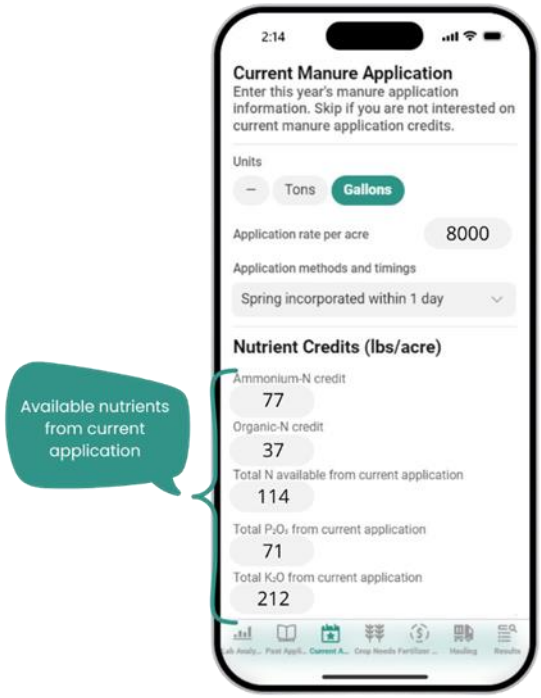
- The tool calculates values for nitrogen (ammonium- and organic-N), phosphorus (as P_2O_5), and potassium (as K_2O) but if interested in only one of the nutrients, for example nitrogen, a user can input just the N content from the manure analysis report.

3. Calculating Nitrogen Credits from Past Applications

In the Past Application tap, the user can provide information about a past manure application (last two years) and estimate the nitrogen credits that carry over into the current cropping year. This reflects that organic N from manure becomes available over a period of three years (year of application, last year, and two years ago). This section does not need to be completed if there were no past applications to the field. The tool assumes the manure analyses entered under the Lab Analyses tab apply to the applications in the past two years as well.



- Past applications can be entered in gallons or tons per acre, depending on the manure type identified in the Lab Analysis tab.
- Once the rate is entered for the past two years, the tool will show the N credits from past applications in lbs N/acre.



4. Calculating Current Year Manure Nutrient Credits

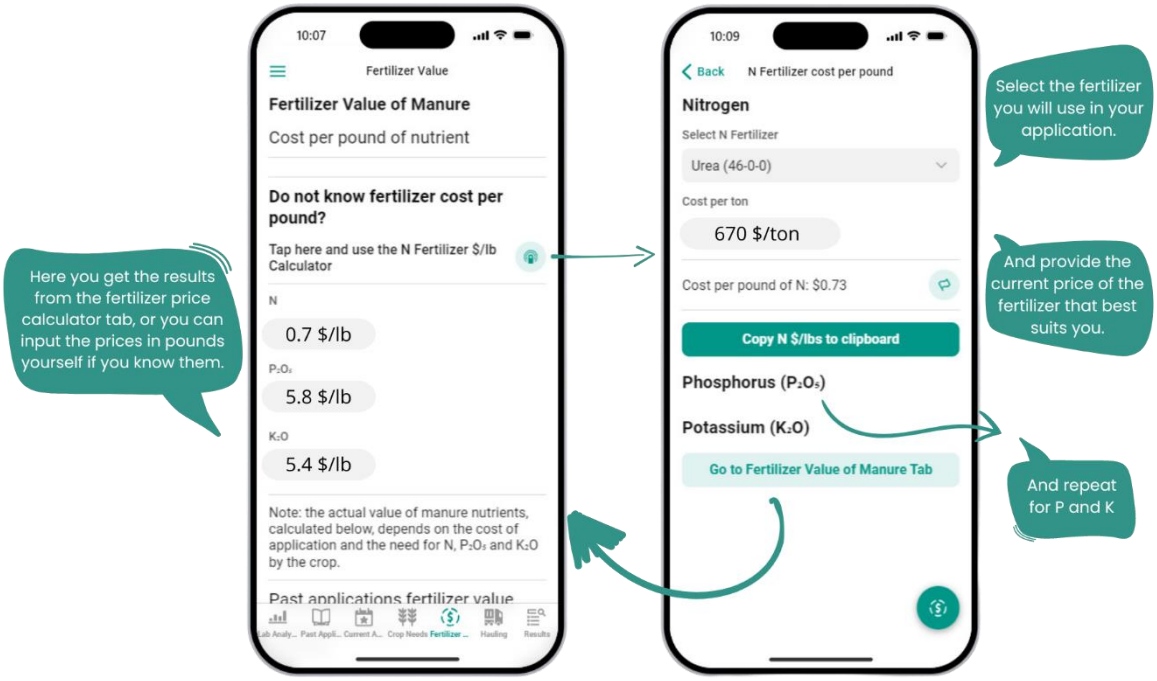
In the Current Application tab, the user can input the application rate, method, and timing of the current year's manure application. This tab calculates the nutrient credits available for the present crop cycle based on the application method and timing, the rate, and the manure analyses that were entered in the Lab Analyses tab. If no rate is added, the app assumes no manure will be or was applied to the current crop. Once the needed information is added, the tool will return the nutrient credits that apply to the current year manure application in lbs per acre of ammonium N, organic N, total N (the sum of ammonium and organic N), P as P_2O_5 (phosphorus fertilizer equivalent), and K as K_2O (potassium fertilizer equivalent).

5. Entering Crop Needs

In the Crop Needs tap, the user can input the nutrient requirements for the current year's crop (N for nitrogen, P_2O_5 for phosphorus, K_2O for potassium). The app will then calculate the "nutrient application balance" which is the difference between what is needed and what is added with the manure allocation and prior crop N credits. When a balance is listed as “Deficit”, the manure application plus past credits provided less than the needed amount of nutrients. When the balance is listed as “Surplus”, more nutrients are allocated than are needed by the crop. Crop needs equal crop supply when the balance status is “Balanced”. Nutrient balance results are always reported in lbs/acre.

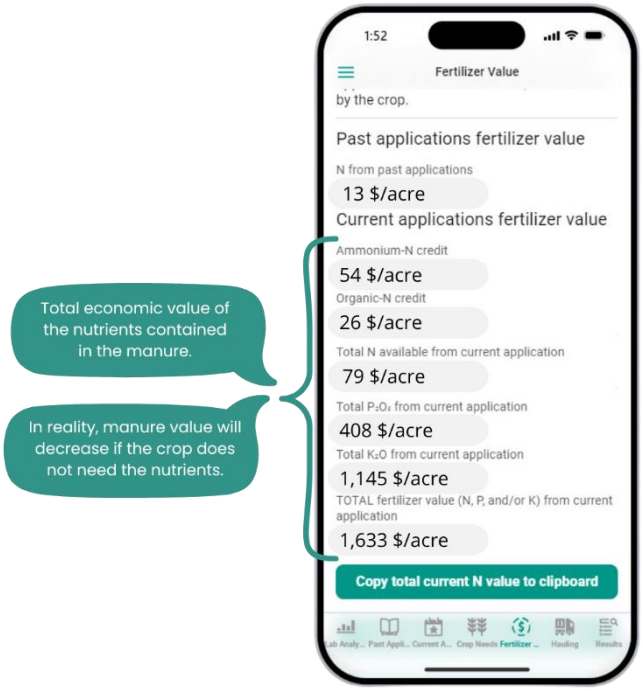
6. Entering Fertilizer Value

The Fertilizer Value tab assists the user in estimating the economic value (fertilizer replacement value) of the current manure application. The user can directly enter the cost per pound of N, P_2O_5 or K_2O. However, if only the cost of a bag of fertilizer and its composition are known, a pop-up tab can help the user calculate the per-pound cost for each nutrient as shown below.



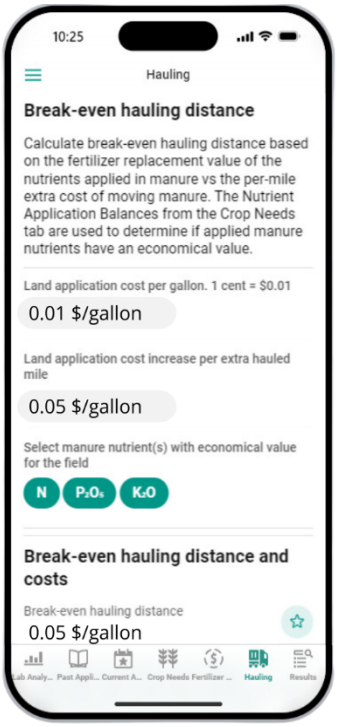
The real fertilizer value of manure nutrients depends on the N, P_2O_5, and K_2O needs of the crop that the manure is being applied to. No value is allocated to manure nutrients that are not expected to be needed by the crop. The fertilizer value tap will report the fertilizer value of past applications (for N only) and the current application. The tool will also report back the total fertilizer value of the manure (N, P and K together).

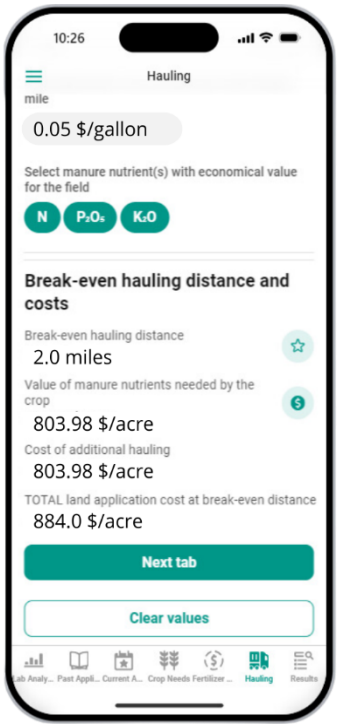
The cost per pound of nutrient does not account for application costs. To calculate the total actual cost of the manure applications (past and present year), cost of application (labor and equipment) should be considered.



7. Calculating Break-Even Hauling Distances and Costs

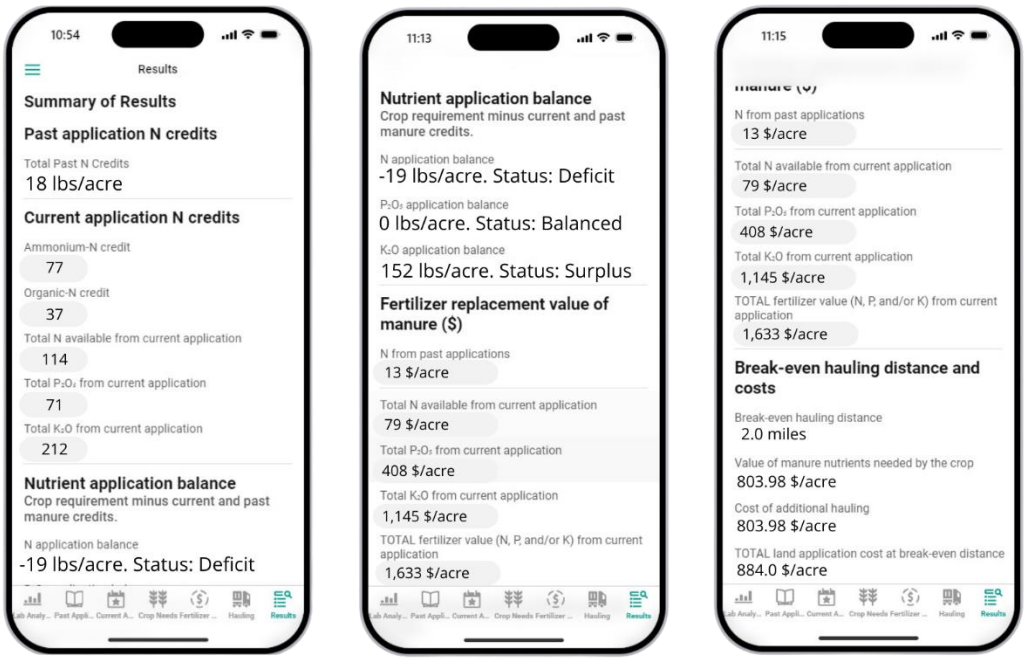
On the Hauling tab, the user can enter the land application cost per gallon of manure. The tool then calculates the land application cost per extra hauled mile and the break-even hauling distance and costs. This calculation requires information from previous tabs. In addition to entering the land application costs, the user will need to have already entered manure analysis, current application rates, crop needs, and fertilizer cost to see break-even hauling distance and per-acre application costs.





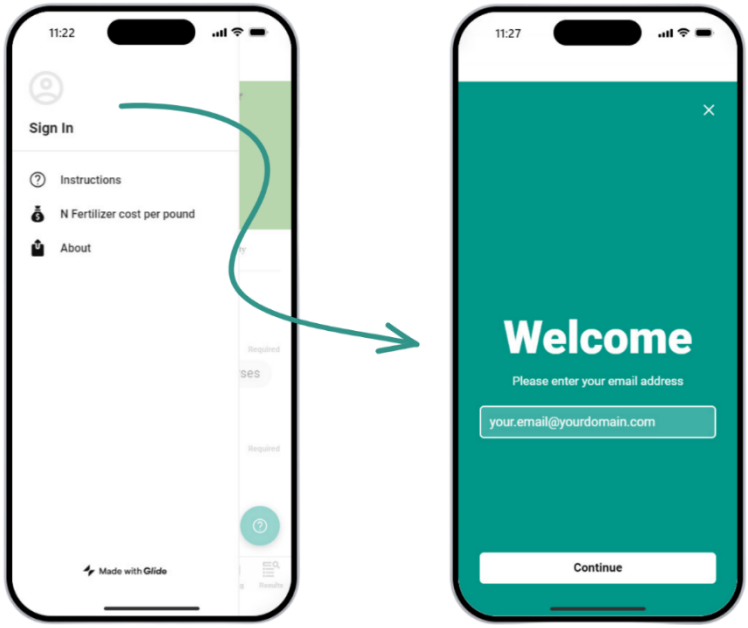
8. Understanding the Results

The Results tab shows the summary of all the calculated values from previous tabs. The current application credits show the amount of nutrients in the current application. The app also shows past manure nitrogen credits, balances, the fertilizer replacement value of the manure, and the break-even hauling distance and costs.



9. Signing in to Save Results

To optimize the use of the app, the user can create a login with their email address and a personalized password. This functionality allows users to store all the inputs that were entered, creating a convenient way to access information later and adjust information to run other scenarios.



Additional Resource

- Instructional Video on how to access and install the Manure Value Calculator on a cellphone.