Value of Manure Calculator User's Guide

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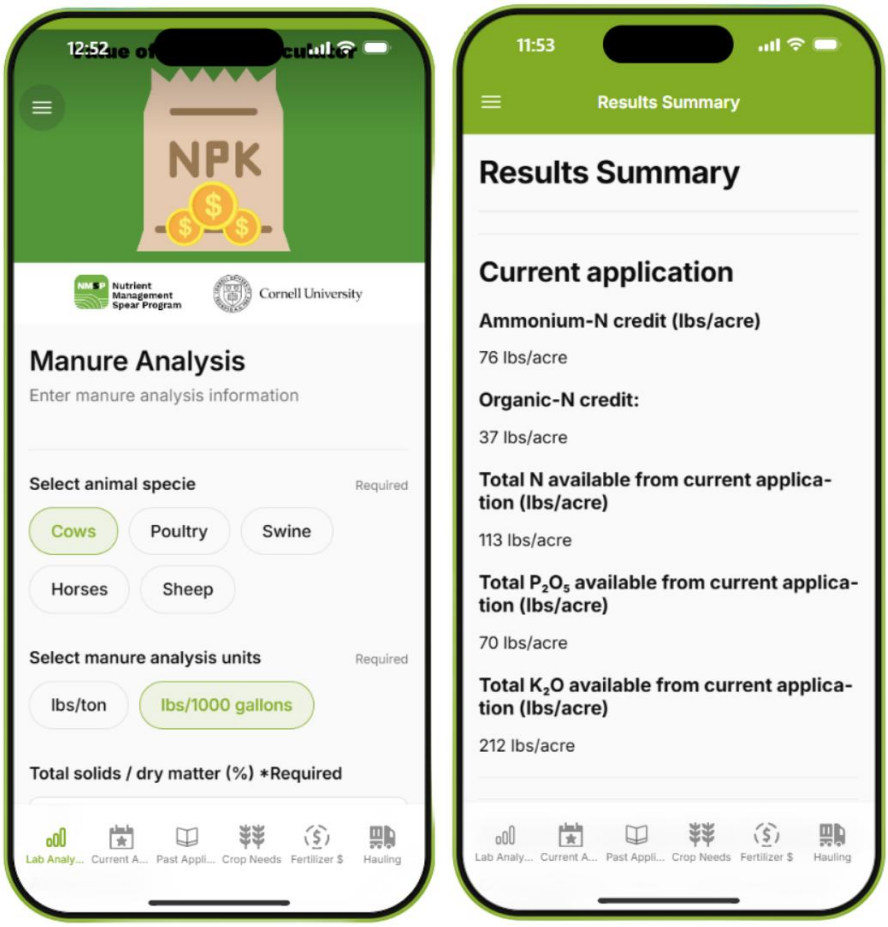

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Executive Summary

- 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.glide.page) 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.

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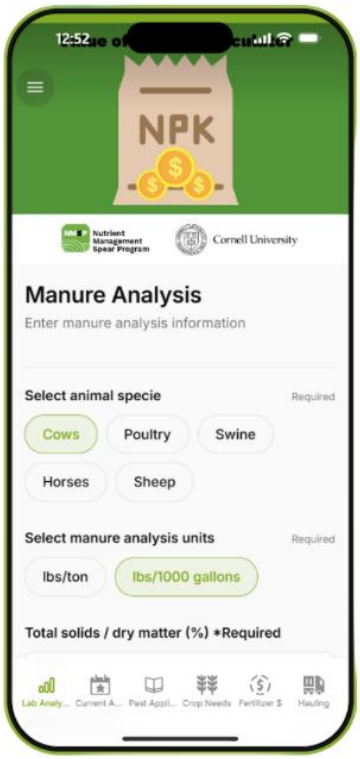
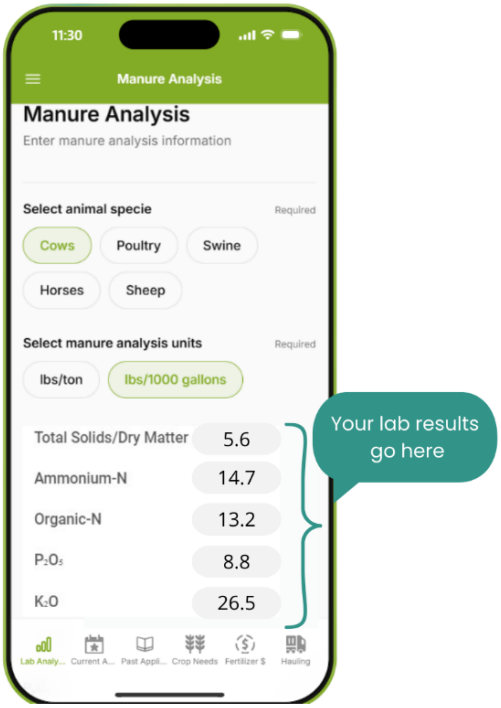
1. Accessing the Value of Manure App

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

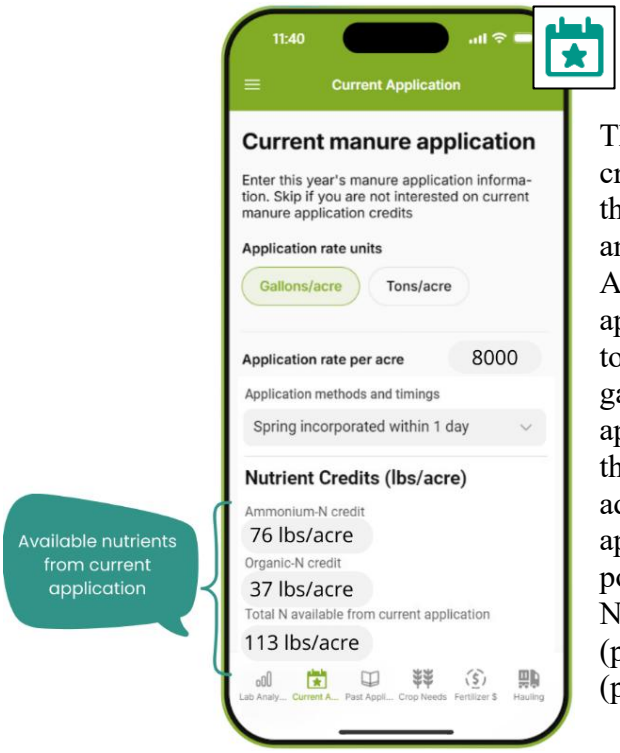


2. Entering a Manure Analysis

The user enters values from a manure laboratory nutrient analysis report in the 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, etc.), then selecting the units (lbs/ton or lbs/1000 gallons), followed by the nutrient analyses from the laboratory report. Animal species, lab analysis units, and manure solid % are required for most calculation in the app.



- 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.
- 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.



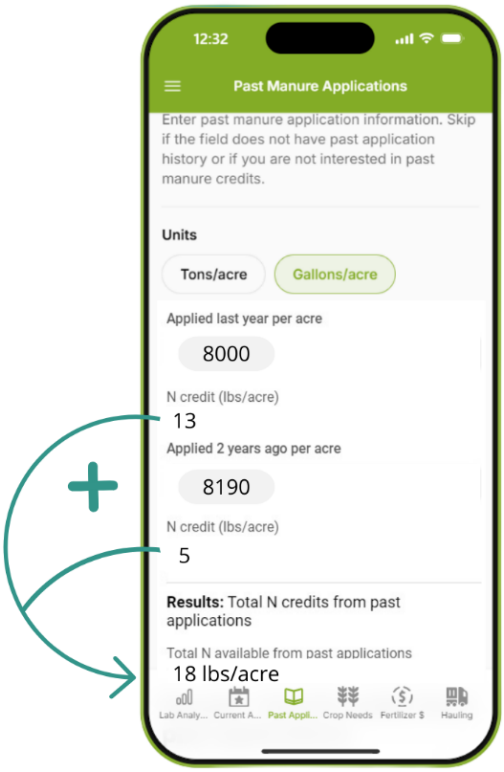
3.Calculating Current Year Manure Nutrient Credits

The Current Application tab calculates the nutrient credits available for the present crop cycle based on the user's application method and timing, the rate, and the manure analyses entered in the Lab Analyses tab. The units of the lab analysis and the application rate must match (lbs/ton goes with ton/acre for solid manure, and lbs/1000 gal with gal/acre for liquid manure). 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 pounds 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).

4. Calculating Nitrogen Credits from Past Applications

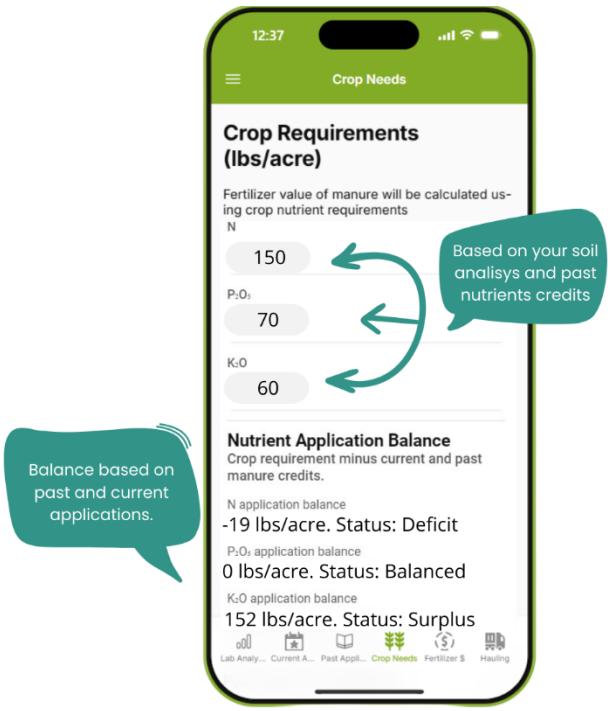
In the Past Application tap, the user can provide information about past manure applications (last year's and two years ago) and estimate the nitrogen credits that carry over into the current cropping year. This reflects that organic N from manure becomes available over a period of three years (year of application, last year, and two years ago). This section does not need to be completed if there are 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 (solid or liquid) identified in the Lab Analysis tab.
- Once the rate is entered for the past one or two years, the tool will show the N credits from past applications in lbs N/acre.



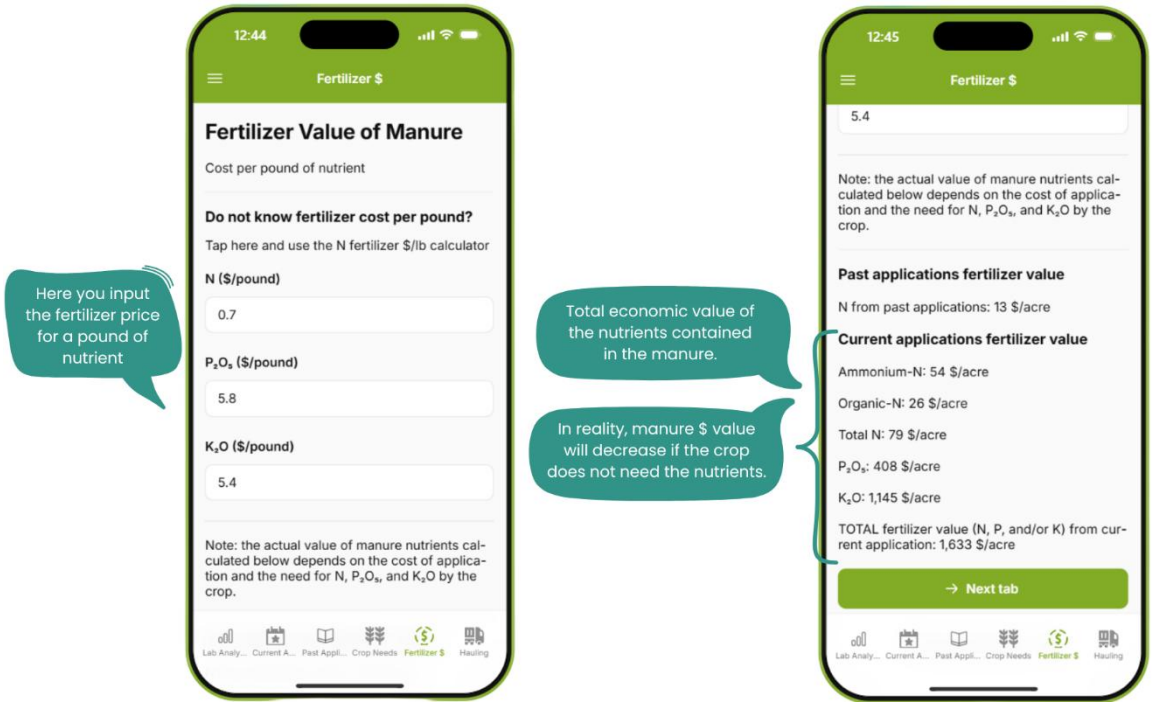
5. Entering Crop Needs

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 the crop need and what is added with the manure allocations. 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. The balance status is “Balanced” when crop needs equal nutrient supply. Nutrient balance results are reported in lbs/acre.



6. Entering Fertilizer Value

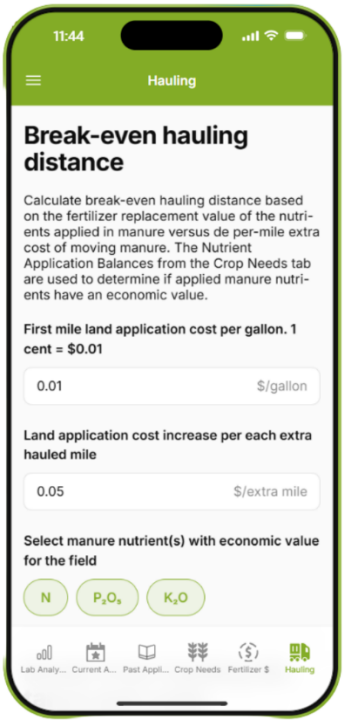
The Fertilizer Value tab assists the user in estimating the economic value (fertilizer replacement value) of the current manure application. The user can directly enter the cost per pound of N, P_2O_5 or K_2O.



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. The fertilizer value tap will report the fertilizer value of past applications (only for N) and the current application. The tool will also report back the total fertilizer value of the manure (N, P_2O_5, and K_2O 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), the cost of application (labor and equipment) should be considered.

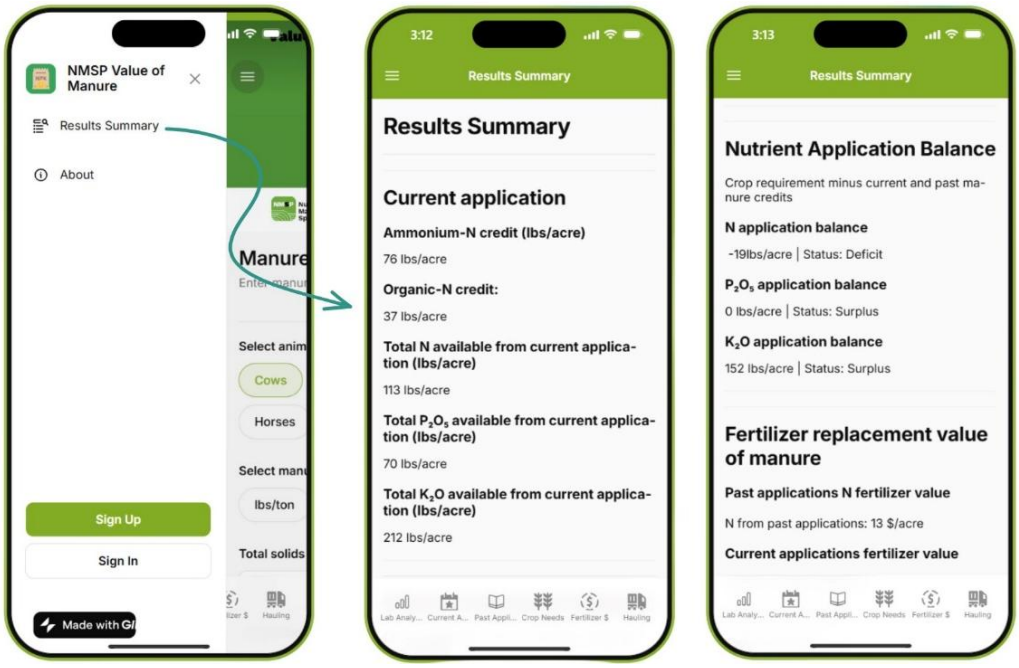
7. Calculating Break-Even Hauling Distances and Costs



On the Hauling tab, the user can enter the "first mile" land application cost per gallon of manure and the "cost increase per extra hauled mile", also per gallon. Then the tool uses those costs, the crop needs (form Crop Needs tab), and the fertilizer value (from Fertilizer $ tab) to calculate the break-even hauling distance. The break-even distance will be larger if the application costs are lower, the crop needs are higher, and/or the manure fertilizer value is higher. 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.

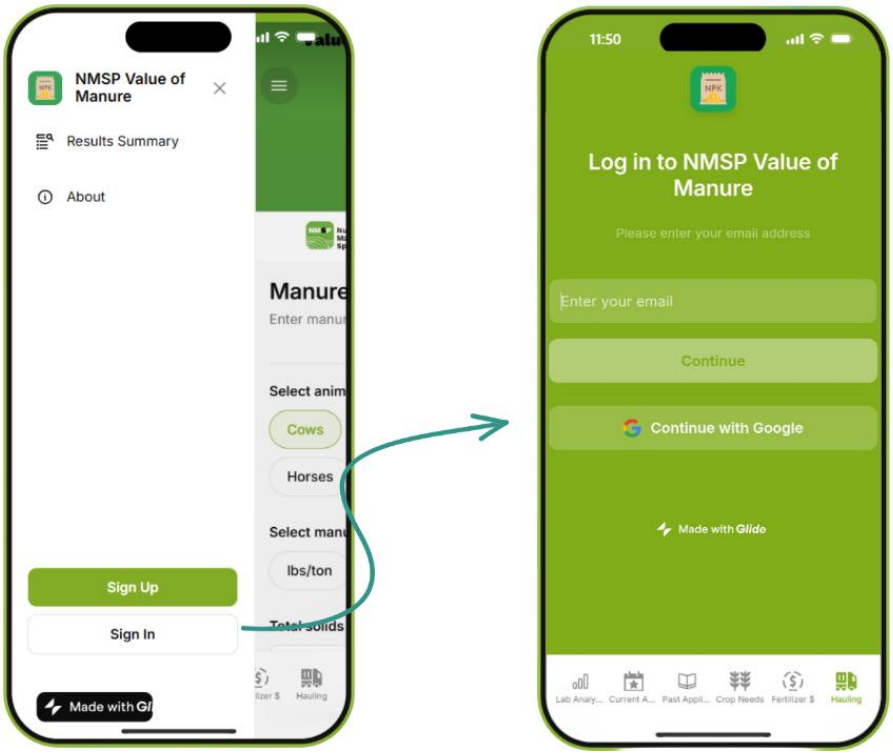
8. Results Summary

The Results Summary 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. Past manure nitrogen credits, balances, the fertilizer replacement value of the manure, and the break-even hauling distance and costs are also listed. To access this tab, click the extra tabs icon in the top left corner and then select Results Summary.



9. Signing in to Save Results

To optimize the use of the app, the user can create a login with their email address. This functionality allows users to store all entered inputs, 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.