MANURE DISTRIBUTION COST ANALYZER

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A Spreadsheet Program

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Program Specifications

Requirements:
Microsoft Windows
Microsoft Excel 2007

Files: Manure Distribution Cost Analyzer.xlsm (called *Analyzer)*

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Analyzer is a computer decision aid and is provided solely on an "As Is" basis. The developer and the University of Missouri are not responsible for any decisions made as a result of this program.

Summary

Manure Cost Distribution Analyzer (called *Analyzer)*, a microcomputer spreadsheet program, has been developed with Microsoft Excel to help determine critical economic costs and management constraints associated with manure distribution. Fixed and variable costs are calculated on a total, per acre and per ton basis.

Introduction

Many factors are combining to cause livestock producers to monitor the application of manure to land. Environmental concerns are increasing in importance. Excessive application of manure on the nearest available land for disposal purposes is coming under increased scrutiny. Nutrients contained in manure can aid in crop production when properly managed but also can contribute to pollution if improperly managed.

Historically, agriculture was composed of integrated activities where livestock producers were able to use manure on their cropland as a fertilizer. As farms began to specialize, livestock producers began raising more animals than they had land to efficiently utilize the crop nutrients in the manure. This has led to the decreased value of manure as a fertilizer. Sometimes, it is cheaper to dispose of manure than to use it.

Contributing to the devaluing of manure is the relatively low cost and high convenience of commercial fertilizers. Crop producers see little need to use manure as a soil fertilizer

and enhancer. Livestock producers wanting neighbors to accept manure on their fields are met with little enthusiasm.

With increased attention to environmental impact and competition from commercial fertilizers, livestock producers must astutely market and use the manure by-product of livestock production. Critical to marketing manure is a better understanding of the costs of transporting and spreading manure.

Analyzer aids in manure marketing plans by helping determine the full cost of transporting and spreading manure on a single field or on all fields that will receive manure.

The full cost of transporting and spreading manure is determined by computing the cost of owning and operating the machinery necessary to accomplish these tasks. The spreadsheet input tables allow a producer to enter the equipment used and the production environment. This information is used to determine the number of hours devoted to manure transport and spreading. Total cost is a function of the per hour cost of owning and operating the power (e.g. tractor or truck) and the per acre cost of owning and operating the spreader (dry or liquid).

Analyzer does not consider the cost of storing manure. Storage of manure is a function of the facilities being used by the livestock producer. To change the storage facilities is a long term decision which will not directly impact the annual decisions of how many acres to spread the manure over or the selling price of the manure to neighboring crop producers. Whether manure is sold to a farmer across the road or 10 miles away has no immediate impact on the cost of storing manure.

When a livestock producer is faced with the decision of spreading manure the pertinent decision factors are manure application rate, fields receiving manure and how much to charge for it.

Using Analyzer

Loading Instructions

Analyzer is a spreadsheet program requiring Microsoft Excel. To load the file, click on the Office Icon in the upper left hand corner of Excel, then click on "open". Find the location of the file on your computer and highlight its name (Manure Distribution Cost Analyzer.xlsm) and then click the "Open" at the bottom of the dialogue box.

Moving Around in *Analyzer*

When first loaded, the first sheet is the Introduction. It contains basic information about the program and its design. Other sheets in the program are where the actual work occurs. At the bottom of the screen you will see several tabs. The titles are:

- Input
- Fields
- Manure Costs
- Machinery Costs

To get to a particular location in the spreadsheet click on the tab of the worksheet you want to see. The sheets entitled "*Input*" and "*Fields*" are the ones where user supplied information can be entered. The gray colored cells are input cells which can be changed by the users. The white cells are computed using input supplied in the yellow cells.

Operation Procedures

Most of the input that users will enter into *Analyzer* are entered at the *Input* sheet. This sheet provides opportunity to enter financial and production information regarding the equipment used, the manure being spread and the land receiving the manure. *Analyzer* begins with data from a hypothetical situation.

Analyzer calculates the full economic cost of owning and operating the equipment necessary to spread manure. Costs are estimated from this input and equations published by the American Society of Agricultural Engineers[1] and the American Agricultural Economics Association[2]. The sheet entitled *Machinery Costs* reports the results of these calculations on a per hour basis for the power source and a per acre basis for the equipment.

Analyzer also estimates the number of hours manure distribution is expected to take given the parameters in the *Manure Costs* sheet. It then combines this information with the cost detail to estimate the total, the per acre and the per ton cost of distributing the manure. Time and cost estimates are reported in the sheet called *Manure Costs*.

The *Input* sheet only provides enough space to enter information for one field. It also requires that the user estimate the number of acres over which the equipment will be used (not just for the single field being modeled). It is advisable to go to the *Fields* sheet and enter all of the fields that will be receiving manure over the course of the year. This allows the program to get a better understanding of how many acres the spreader will cover and how many hours the tractor will run. The pertinent information regarding application time and cost is reported on a per field basis.

The "Total Manure Available" is reported on the Fields sheet in cell I7. This was input that the user gave on the Input sheet. As fields are entered into the Fields sheet cells E9 through AQ13, the "Total Manure Applied" is calculated. If the Available does not equal the

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[1] 1991 ASAE Standard S459, Uniform Terminology for Agricultural Machinery Management, pp. 287-288; EP496, Engineering Practices and Data, pp. 288-294; D497, Agricultural Machinery Management Data, pp. 295-301.

[2] Cross, Timothy L. and Gregory M. Perry. Depreciation Patterns for Agricultural Machinery. *Amer. J Agr. Econ.* 77(February 1995):194-204.

Applied, a message will appear instructing the user to either add or remove fields. The number of acres receiving manure at a specified rate should equal the manure available. If it does not, the calculations will still work on the assumption that you will be able to get the manure from somewhere.

Once the fields have been entered, push the "Compute" button to run the fields through the program. Each field will have a cost and application time calculated. The total of all fields is used calculate the average distance hauled and the average cost per unit applied.

If the user desires to know more about the composition of costs and time, the Manure Costs sheet contains a breakdown of the ownership and operating costs on a per-acre, per-1000 gallon and total basis. Machinery Costs sheet contains a detailed breakdown of the ownership and operating cost of both the tractor and spreader, on a per-hour basis.