Ration versus Rotations (RvR.xls) Instructions

by
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Introduction

There are two "Tabs" on this Excel spreadsheet that require user input. They are "Basic Inputs" and "Rotation Used." The "Results" tab is an output report that summarizes the information entered and the results of the calculations.

The "Basic Inputs" Tab

All ration adjustment programs need a starting point. The starting point in this program is an all alfalfa hay (no corn silage) ration. As you add corn silage into the cropping rotation the program removes alfalfa hay and corn grain and adds protein to the ration. The amount that is removed and added is determined by the entries in "Prices, etc.", see Figure 1. The user can tailor the analysis to their situation by changing any of the values in Figure 1.

Figure 1

Requirements of an **All Alfalfa Rotation Ration**		**Prices, etc.**	
Tons Alfalfa Dry Matter Raised per Cow	8.00	$ 2.25	Corn Price per Bushel
Bushel Corn Grain Required per Cow	110.0	$ 200	Protein source (Price per Ton)
Pounds Protein Source Required per Cow	1,500	8.00%	Percent Protein in Corn Silage
		18.00%	Percent Protein in Alfala
		44%	Pecent protein in protein source
		6.5	bushel of corn replaced by a ton of corn silage

If you plan to buy some of the cow's forage requirements, reduce the "Tons of Forage Dry Matter Raised per Cow" accordingly.

In addition, to adjusting your ration, this program looks at the changing level of nutrients in your soil as you change that ration. In order to do this the program needs information on the amount of phosphorus (P) and potassium (K) required by the various crops. You can either accept the pre-entered values or enter your own values.

Figure 2

Phosphorus (P) and Potassium (K) Requirements

Crop	P	K
Corn per bushel	0.43	0.28
Corn Silage (35% DM)	2.65	7
Alfalfa Hay (88% DM)	12	50

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The program also needs information about the amount of manure produced per cow, the nutrient content of that manure, and the amount of nitrogen credit when you plow down sod, etc. Figure 3 shows the values the program requires. The user enters some of these and some are calculated based on the inputs shown in Figure 2.
Manure's nutrient value is entered in pounds of N, P, and K per ton of manure. If you have liquid manure, enter the pounds of N, P, and K per 1,000 gallons and then enter the number of "1000 Gallons of Manure" wherever the program asks for "Tons of Manure." All of the entered N, P, and K values must be in pounds. The crops remove N, P, and K, so their values must be negative.

The number next to the "Task Name" is used to develop the rotation used. Your expected rotation is entered on the "Rotation Used" Tab.

Figure 3

					Yield TDM			
No.	Task Name	N	P	K	Corn Silage	Alfalfa		Description
1	Manure Spreading	4	3	10			20	Tons of Manure / Cow
2	Plowing Down Sod	120	0	0			Nutrients from sod only	
3	Corn for Grain	-160	-52	-34			120	bushel yield
4	Corn Silage (1st Y)	-160	-53	-140	7		Corn Silage 1st Y after sod	
5	Corn Silage (other Y)	-160	-48	-126	6.3		Corn Silage other years	
6	New Seeding	-40	-27	-114		2.00	Establishment of Alfalfa	
7	Alfalfa (1st Y)	0	-61	-256		4.50	Established Alfalfa	
8	Alfalfa (2nd Y)	0	-55	-227		4.00	0.5	Decrease in Alfalfa
9	Alfalfa (3rd Y)	0	-48	-199		3.50		Yield (Tons/Year)
10	Alfalfa (4th Y)	0	-41	-170		3.00		
11	No Crop	0	0	0		-	No Crop	

The alfalfa yield may be reduced by "X" tons of dry matter (0.5 tons, in this example) in each subsequent year. The corn silage yield will be 10 percent higher in the year following the plowdown than in the corn after corn year(s).

Figure 4

Costs per Acre

	Alfalfa Seeding	Corn Silage
Variable Cost	$ 42	$ 136	$152
Land Charges	$ 72	$ 72	$ 72
Other Fixed Costs	$ 136	$ 137	$151
Total Costs	$ 249	$ 344	$375

Land Interest Charge	$ 50
Property Taxes/A	$ 22
Total	$ 72

The program also determine your feed cost per cow as you add corn silage to the ration. In order to make that calculation it needs to know your costs per acre of the three forage crops in this analysis. You may wish to use the Agriculture Budget Calculation Software (ABCS) to determine your costs. ABCS allows the user to enter the

tasks involved in the production process and the inputs required by each task.

The "Rotation Used" Tab

This tab does not require much input, but it is extremely important. Here you must enter the "tasks" or "events" that occur in this rotation. They must be entered by the number that corresponds to "Task Name" on the "Basic Input" tab. In addition, you must enter the year, in the rotation, in which this "task" or event will occur. Note: More than one event can occur in one year. See Figure 5.

Figure 5

Year	Task #	Task Name	Tons or Times
1	1	Manure Spreading	10
1	2	Plowing Down Sod	1
1	4	Corn Silage (1st Y)	1
2	1	Manure Spreading	20
2	3	Corn for Grain	1
3	1	Manure Spreading	15
3	3	Corn for Grain	1
4	1	Manure Spreading	7
4	6	New Seeding	1
5	7	Alfalfa (1st Y)	1
6	8	Alfalfa (2nd Y)	1
7	9	Alfalfa (3rd Y)	1
0	11	No Crop	1
0	11	No Crop	1
Tons of Manure Spread per Acre per Year			7.4
Acres Required to Spread a Cow's Manure			**2.69**

Tons of Manure Applied per Cow	19.8
if not equal to	20
, adjust tons spread.	

You must also enter the tons of manure spread each time you enter "Manure Spreading" as a task. The other values in that column should be "one."

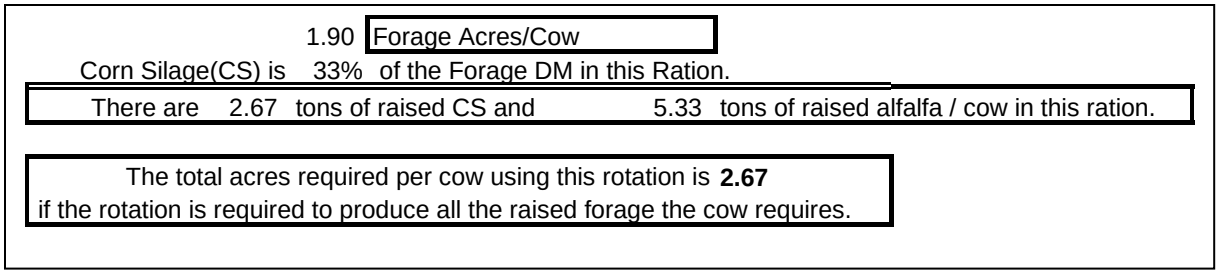
Here the program shows you the tons of manure you will be applying per cow per year if you follow this set of "tasks and years". If that number is not equal to the number of tons of manure you stated was produced per cow (on the "Basic Inputs" tab), then you need to adjust the tons spread until the two values are approximately equal.

The "Results" Tab

Under the "Results" tab you will find several blocks of information. The first block of information is the forage acres required per cow, the composition of the ration (alfalfa versus corn silage) and total acres required per cow. See Figure 6.

The total acres required per cow is the acres required based on the rotation entered. You may have other rotations, for different types of land, in your farming operation.

Figure 6



The next section, Figure 7, shows more information about the yields you entered, the acres per cow in the various crops, and years each crop is part of the rotation. This section also shows the number of cows that can be supported per 100 acres in this rotation and the grain produced per cow, if this rotation is used.

Figure 7

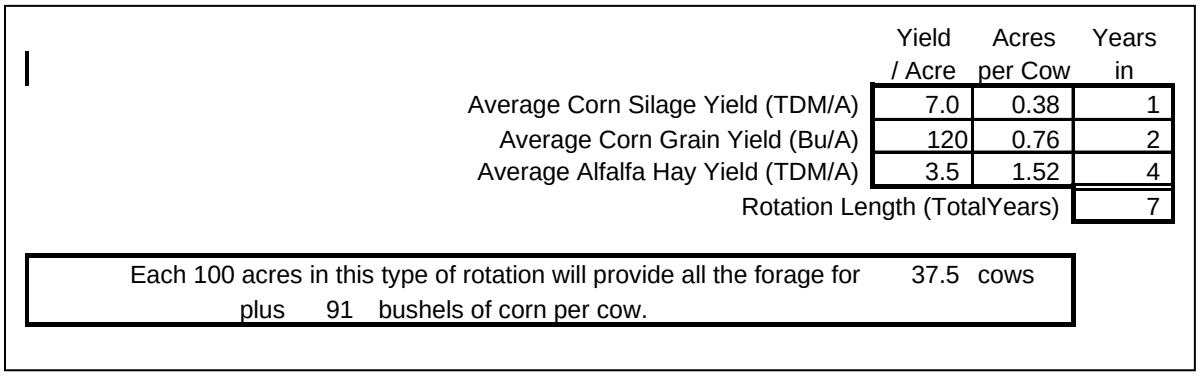
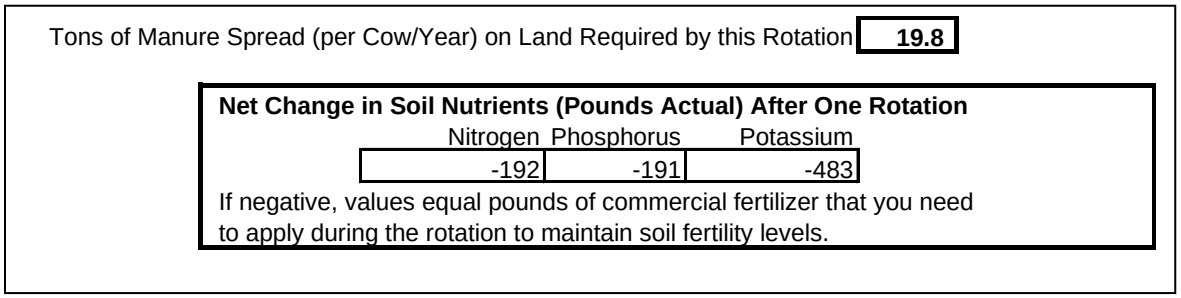


Figure 8 show the change in the level of soil nutrients on the land in this rotation, after spreading the user determined number of tons of manure per cow per year.

Figure 8



The remaining three sections are on the economics of changing your rotation and

therefore your ration. The two sections are the changes in feed costs per cow. The first is the extra **feed** cost per cow with the changed rotation. The second section is the extra **total** cost per cow. This calculation includes the saving on land and other non-cash costs. The extra total cost is normally less than the extra feed cost, because of the land and machinery overhead saving.

Figure 9

Economics

$	121.21	Additional Protein Cost per Cow versus an all Alfalfa Ration
$	39.00	Reduce Energy Cost versus an all Alfalfa Ration
$	**82.21**	**Extra feed cost per cow per year versus all alfalfa Ration**

$	90.33	Extra Cash Cost in this Ration (Rotation) versus All Alfalfa
$	(27.43)	Extra Non-Cash Land Costs versus All Alfalfa
$	(45.91)	Extra Other Non-Cash Costs
$	16.99	Extra Total Cost per Cow in this Ration (Rotation) versus All Alfalfa

The above costs are calculated based on the prices of energy and protein and the information on cost of production of raised forages as supplied by the user. The cost of forage production is reiterated in Figure 10.

Figure 10

Cost per Ton of Forage Dry Matter (DM)

Yield Tons Dry Matter (TDM)	2.00	4.00	7.00
Forage	New Seeding	Alfalfa	Corn Silage
Variable Cost	$ 67.77	$ 10.42	$ 21.66
Land Charges	$ 36.00	$ 18.00	$ 10.29
Other Fixed Costs	$ 68.32	$ 33.91	$ 21.61
Total Costs	$ 172.08	$ 62.33	$ 53.55
Average cost of a ton of Hay (alfalfa) production			$ 78.01

This may be a good time to discuss the land cost issue. Total land costs were entered as $72 per acre in this example. As this value increases the advantage that higher alfalfa forage rations have disappears, because the amount of land per ton of corn silage (DM) is less than land required per ton of alfalfa hay (DM).

CONCLUSIONS AND SUMMARY

This program should be used to provide site-specific information. The results are only as good as the data the user enters.