FARM BUSINESS MANAGEMENT

FARM ECONOMICS Facts & Opinions

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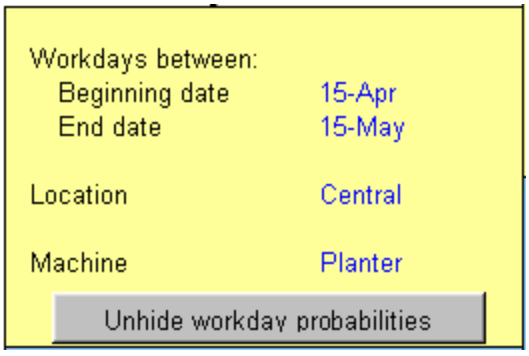
NEW SPREADSHEET TOOL FOR MACHINERY ECONOMICS

A new Microsoft Excel spreadsheet has been developed to provide economic information on machinery issues commonly faced by farmers. The spreadsheet will 1) calculate the probabilities of being able to complete machinery operations between beginning and ending dates, 2) calculate the costs of tillage and planting operations, and 3) calculate the cost of combining. The spreadsheet is named *Machinery Economics* and is part of the *FAST* decision aids available for download at *farmdoc* (see http://www.farmdoc.uiuc.edu/finance/business.html).

Probability of completing field operations

The "work" sheet of *Machinery Economics* will calculate the probability of being able to complete field operations between a beginning and ending date. Information in this sheet is particularly useful for farmers expanding their land base and are considering whether their current equipment complements will complete field work in a timely manner.

As illustrated in the box below, users of *Machinery Economics* select a beginning and ending date, a location, and a machine. The example is for a farmer in central Illinois examining the probabilities of being able to complete planting between April 15th and May 15th.



Machinery Economics has three default locations: northern, central, and southern Illinois. For

each location, weather data are used to calculate the probability of performing field work on different days of the year. These probabilities vary across Illinois. *Machinery Economics* has five machine selections: planter, drill, planter/drill, combine, and other.

Based on the above input, *Machinery Economics* calculates the total number of days between the beginning and end date, the average number of work days, and a distribution of work days.

Total days between begin and end date	31 days
Average work days	9 days
Workdays between:	Chance
0 and 6	10%
7 and 12	76%
13 and 18	14%
19 and 24	0%
25 and 30	0%

The above output is based on the central Illinois, planting example. Between April 15th and May 15th there are 31 days. On average, there are 9 days in which field operations can be performed (i.e. average work days is 9). Work days obviously will vary from year to year. Estimates suggest that there will be less than 6 days in which field operations can be performed in 10 percent of the years, between 7 and 12 days in 76 percent of the years, and between 13 and 18 days in 14 percent of the years (see box above).

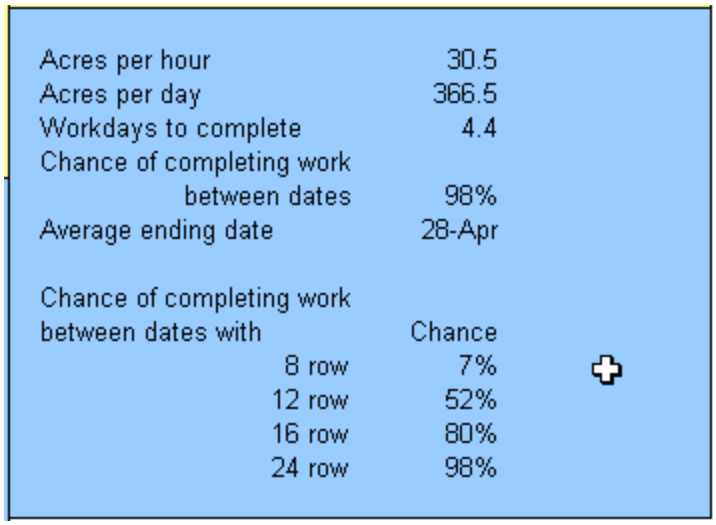
Next, users of *Machinery Economics* enter information concerning the machine's size, hours of work per day, and acres to cover. Exact questions asked will vary depending on the machine that is selected. The following box shows input for a planter.

Planter

			Suggestions
Row width	30	inch	30
No. of row	24		
Speed	6	mph.	6
Hours worked	12	per day	
Field efficiency	70%	percent	70
Acres	1600	no.	

The planter described in the above box has 24 rows that are 30 inches apart. The planter will be operated 12 hours per day, will be driven 6 miles per hour, and will have a 70 percent field efficiency (i.e., while the planter is in the field it will be running 6 miles per hour 70 percent of the time). The planter will cover 1,600 acres.

This planter covers 30.5 acre in one hour and 366.5 acres in a 12 hour day (see box below). It will take 4.4 days to plant 1,600 acres. There is a 98 percent chance of planting the 1,600 acres between April 15th and May 15th, the dates entered in the first input box. The average ending date of the planting will be April 28th.



Acres per hour	30.5
Acres per day	366.5
Workdays to complete	4.4
Chance of completing work between dates	98%
Average ending date	28-Apr

Chance of completing work between dates with	Chance
8 row	7%
12 row	52%
16 row	80%
24 row	98%

Machinery Economics also gives the probabilities of completing the work given different sized planters. There is a 7 percent chance of covering 1,600 acres between April 15th and May 15th with an 8 row planter, 52 percent chance with a 12 row planter, and 80 percent chance with a 16 row planter (see bottom of the above output box).

These probabilities will change given input changes: reducing hours work from 12 hours to 10 hours reduces the probability of planting 1,600 acres with a 24 row planter from 98 percent down to 95 percent, reducing speed from 6 miles per hour down to 5 miles per hour reduces the probability from 98 percent to 95 percent, and reducing field efficiency from 70 percent to 65 percent also reduces the probability to 95 percent.

Probability and cost information

The above probability information can be combined with cost information available from the *Machinery Economics* spreadsheet to examine tradeoffs between different sized machines. Larger machines will generally increase the probability of completing field work but will also cost more than smaller machines.

This spreadsheet is part of the *FAST* spreadsheets available at *farmdoc* (http://www.farmdoc.uiuc.edu/finance/business.html)

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