

Days Suitable for Fieldwork in Arkansas

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Several sources of risk influence decisions in production agriculture. Weather risk influences timing of applications, machinery management and whole-farm planning. Knowledge of the expected number of days suitable for fieldwork is the first step in managing weather risk. The estimates presented here have been improved over previous estimates by including years 1975 to 1994 and 2008 to 2009 from the USDA National Agricultural Statistics Service, Arkansas Field Office (NASS – AR FO) weekly Crop Progress and Condition Report.

Farm decisions are based upon the likelihood of having an expected number of days suitable for fieldwork and should anticipate a below-average year rather than a good or average year. The average year may be defined as the 50th worst year, with half of

the years having fewer days and half the years having more days suitable. A bad year may be defined to be the 15th worst year out of 100 years. Table 1 presents the number of days suitable for fieldwork in Arkansas each week at the 15th, 35th, 50th, 65th and 85th worst years.

Different crops are typically planted at different times of the year based on the biology of the crops. Planting decisions are also influenced by the relative economic value of the crops. Table 2 shows the typical windows of time for planting cotton, rice and soybeans based on 5-year averages. In an average year, Arkansas is expected to have 13.2 days suitable for fieldwork during the typical window for planting cotton, 18.1 days for rice and 28.3 days for soybeans (Table 2).

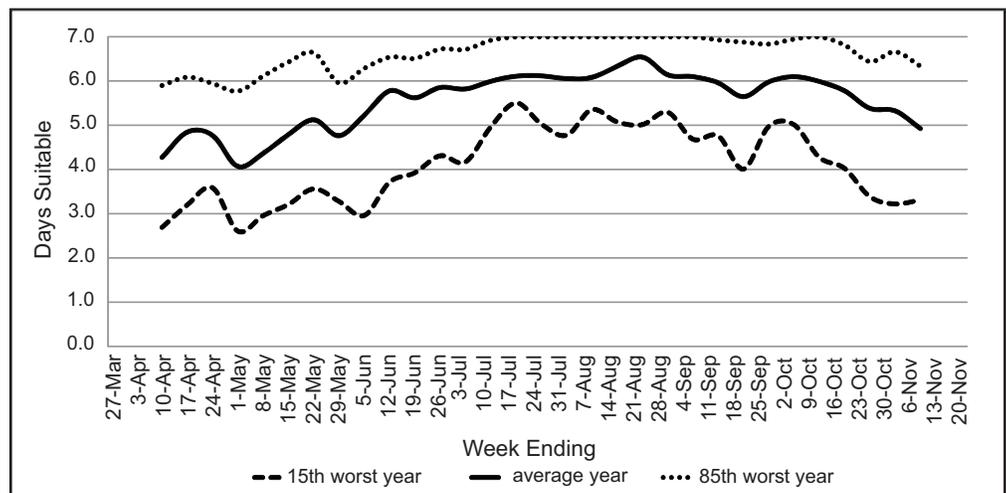


Figure 1. Expected days suitable for Arkansas fieldwork in good, average and bad years. Data source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

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In bad years, the number of suitable days drops to 8.8 for cotton, 12.4 for rice and 18.8 for soybeans. The practical implication of days suitable is whether all the acreage can be planted to the respective crops within a given period of time. A balance among the acreage of each crop, available machinery and expected good fieldwork days is necessary.

For cotton, there is a 40% chance of having between 12 to 14 days suitable for fieldwork between April 29 and May 20 (the time period that majority of cotton is planted) (Figure 2). Based on the acreage and equipment, a farm that needs more than 18 days to plant will only be able to complete planting operations less than one out of five years (20%) (Figure 2).

Most Arkansas farms produce multiple crops such that the planting periods overlap and the available days suitable must be distributed across multiple crops. Figure 3 and Figure 4 are examples of two crops, rice and soybean, that are produced together on the same farm with the same equipment. For instance, if rice acreage was planted before soybean acreage, then the probabilities for days suitable for the soybean planting periods must be adjusted by subtracting the days already allocated to rice planting.

Typically, there are more days suitable for fieldwork in the fall than in the spring. There is more than a 50% chance of having between 43 and 49 days suitable for fieldwork during the 8-week period from September to October and a 90% chance of having more than 43 (Figure 5).

Importance of Understanding Days Suitable for Fieldwork

Conducting field operations such as tillage, planting, spraying and harvesting in a timely manner is important to obtain optimal yields to maximize whole-farm profitability. Machinery management decisions, such as choosing machine sizes

Table 1. Estimated number of days suitable for fieldwork in Arkansas.

| Week ending | Percentile probability of days suitable | | | | |
|-------------|-----------------------------------------|------|------|------|------|
| | 0.15 | 0.35 | 0.50 | 0.65 | 0.85 |
| 11-Apr | 2.7 | 3.6 | 4.3 | 4.9 | 5.9 |
| 18-Apr | 3.2 | 4.1 | 4.8 | 5.5 | 6.1 |
| 25-Apr | 3.6 | 4.4 | 4.8 | 5.2 | 6.0 |
| 2-May | 2.6 | 3.5 | 4.1 | 4.7 | 5.8 |
| 9-May | 3.0 | 3.9 | 4.4 | 5.1 | 6.1 |
| 16-May | 3.2 | 4.2 | 4.8 | 5.4 | 6.4 |
| 23-May | 3.6 | 4.6 | 5.1 | 5.8 | 6.6 |
| 30-May | 3.3 | 4.1 | 4.8 | 5.2 | 6.0 |
| 6-Jun | 3.0 | 4.8 | 5.2 | 5.7 | 6.3 |
| 13-Jun | 3.7 | 5.4 | 5.8 | 6.0 | 6.5 |
| 20-Jun | 3.9 | 5.1 | 5.6 | 6.0 | 6.5 |
| 27-Jun | 4.3 | 5.5 | 5.9 | 6.0 | 6.7 |
| 4-Jul | 4.2 | 5.2 | 5.8 | 6.2 | 6.7 |
| 11-Jul | 5.0 | 5.9 | 6.0 | 6.1 | 6.9 |
| 18-Jul | 5.5 | 5.9 | 6.1 | 6.6 | 7.0 |
| 25-Jul | 5.0 | 5.9 | 6.1 | 6.5 | 7.0 |
| 1-Aug | 4.8 | 5.8 | 6.1 | 6.5 | 7.0 |
| 8-Aug | 5.4 | 5.9 | 6.1 | 6.5 | 7.0 |
| 15-Aug | 5.1 | 6.0 | 6.3 | 6.8 | 7.0 |
| 22-Aug | 5.0 | 6.0 | 6.6 | 6.8 | 7.0 |
| 29-Aug | 5.3 | 5.9 | 6.2 | 6.6 | 7.0 |
| 5-Sep | 4.7 | 5.8 | 6.1 | 6.5 | 7.0 |
| 12-Sep | 4.8 | 5.7 | 6.0 | 6.2 | 6.9 |
| 19-Sep | 4.0 | 5.2 | 5.7 | 6.2 | 6.9 |
| 26-Sep | 5.0 | 5.8 | 6.0 | 6.2 | 6.8 |
| 3-Oct | 5.0 | 5.9 | 6.1 | 6.5 | 7.0 |
| 10-Oct | 4.3 | 5.4 | 6.0 | 6.5 | 7.0 |
| 17-Oct | 4.0 | 5.2 | 5.8 | 6.0 | 6.8 |
| 24-Oct | 3.4 | 4.5 | 5.4 | 5.9 | 6.4 |
| 31-Oct | 3.2 | 4.7 | 5.3 | 5.9 | 6.7 |
| 7-Nov | 3.3 | 4.3 | 4.9 | 5.6 | 6.3 |
| 11-Apr | 2.7 | 3.6 | 4.3 | 4.9 | 5.9 |
| 18-Apr | 3.2 | 4.1 | 4.8 | 5.5 | 6.1 |
| 25-Apr | 3.6 | 4.4 | 4.8 | 5.2 | 6.0 |
| 2-May | 2.6 | 3.5 | 4.1 | 4.7 | 5.8 |

Data Source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

Table 2. Crop planting progress time periods for Arkansas.

| | Planting completed* | | Calendar days | Expected days suitable (worst years out of 100) | | |
|---------|---------------------|--------|---------------|-------------------------------------------------|------|------|
| | 20% | 80% | | 15th | 50th | 85th |
| Cotton | 29-Apr | 20-May | 21 | 8.8 | 13.2 | 18.3 |
| Rice | 11-Apr | 9-May | 28 | 12.4 | 18.1 | 24.0 |
| Soybean | 1-May | 12-Jun | 42 | 18.6 | 28.3 | 37.2 |

Source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

*Note: Dates are average planting progress and not an indication of optimum planting period, i.e., these dates should not be interpreted as recommended planting dates.

relative to farm acreage, should take into consideration the likelihood of having sufficient days suitable to operate the machinery. A tradeoff exists between the added cost of machinery and completing field operations in a timely manner. Additional machinery requires increased capital investment while field operations conducted at non-optimal times lead to reduced yield.

Information on the number of days suitable for fieldwork can be used to estimate the appropriate machinery size for individual farms or conversely to choose acreage to fit a given set of equipment if extra acreage is available in the local farmland market.

Bottom-Line Considerations

Data presented here are for the entire state of Arkansas and may not adequately represent any single location in a given year. The estimation procedures assume that each of the 35 years has an equally likely probability of occurring next year and the days suitable in a given week are independent of the week before and the week after the week in question.

Although actual number of days suitable for fieldwork varies from year to year, probability of suitable days can be used to make farm management decisions on machinery management, crop allocation and farmland acquisition. Several other factors influence days suitable for a given location, farmer or field including soil texture, previous tillage management or machinery configuration. Other technologies that do not influence days suitable for fieldwork may increase the likelihood of completing fieldwork, such as GPS-enabled navigation technologies which can increase field efficiency and extend the hours per day that machinery can be operated. The farm decision maker may opt to use data for a year worse than the average year.

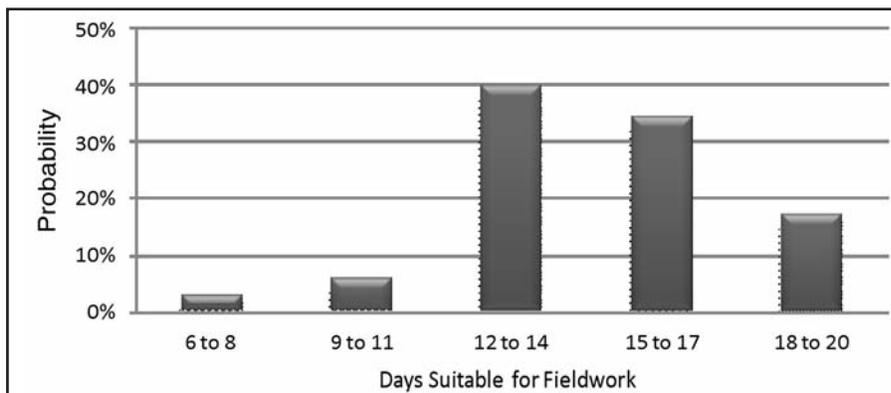


Figure 2. Days suitable during the cotton planting season.

Data source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

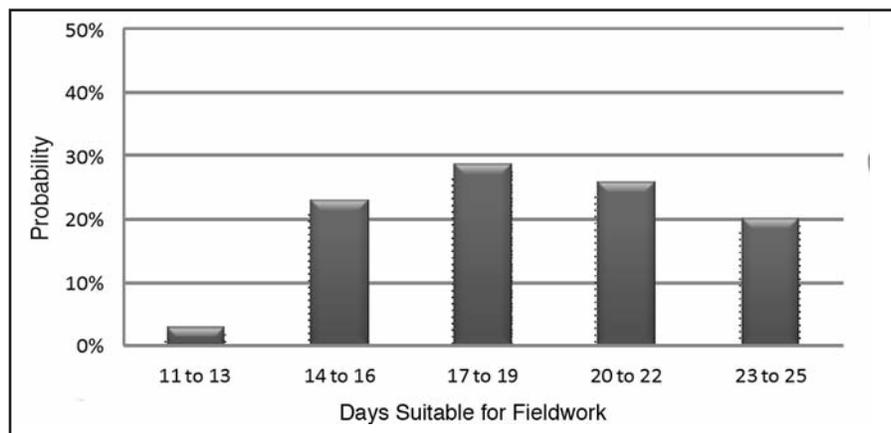


Figure 3. Days suitable during the rice planting season.

Data source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

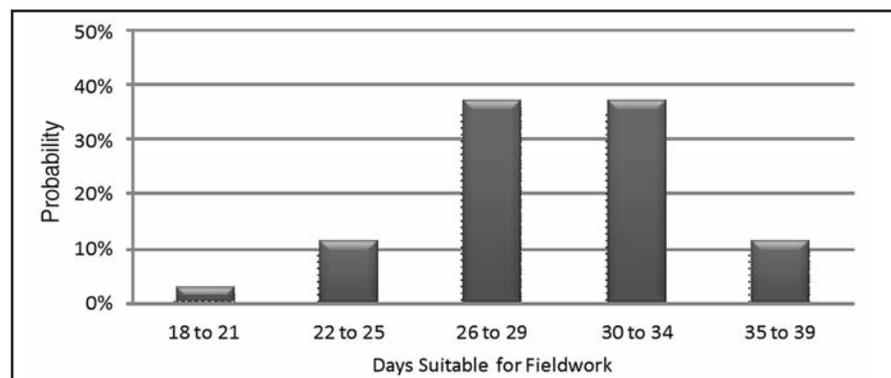


Figure 4. Days suitable during the soybean planting season.

Data source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

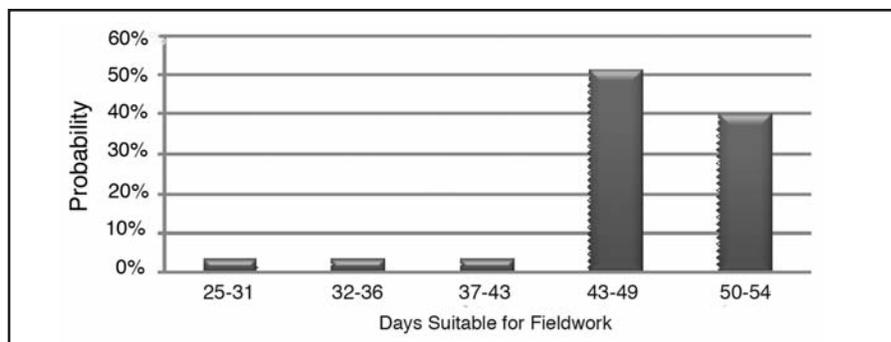


Figure 5. Days suitable during September and October.

Data source: National Agricultural Statistics Service, Arkansas Field Office: 1975-2009.

Using Days Suitable for Fieldwork Information

Example: A 4,000-acre farm is to be planted half to rice and the other half to soybean with one 25-foot grain drill. The drill can plant 12 acres in one hour and can be operated 10 hours per day for a total of 120 acres per day (12 acres per hour multiplied by 10 hours per day). It takes 33.33 days (4,000 acres divided by 120 acres per day) to complete planting of both crops and 16.67 days to complete rice planting.

Assuming the farmer wishes to plant rice between the dates of April 11 and May 9, there are, on average, 18.1 days suitable for fieldwork, more than the 16.67 days required to finish planting (Table 2). In the event of a bad year (15th worst year), there are only 12.4 days suitable for fieldwork (Table 1), leaving 4.27 days needed to finish planting the remaining 512 acres.

The farmer can calculate the necessary equipment size to be able to complete rice planting in a “bad” year. Given that there are 12.4 days suitable for fieldwork, 161.3 acres must be planted on each good day. If the farmer still operates the equipment 10 hours per day, then a machine that can cover 16.13 acres per hour is needed to complete planting in the 15th worst year.

Data Resources

USDA National Agricultural Statistics Service, Arkansas Field Office. *Crop Progress and Condition Report*.

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