Working for Peanuts: Acquiring, Analyzing, and Visualizing Publicly Available Data




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Abstract

Data visualization has become important to farm management and commodity marketing during recent price and weather phenomena. Accessing and evaluating United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS) data via software tools empowers rural property professionals to mitigate risk. Data acquisition and visualization examples include days suitable for fieldwork (DSFW) during peanut planting and harvest in 11 peanut producing states. The overall objective was to share techniques to access and analyze publicly available data. Specific objectives were to demonstrate software tools to define most active dates for field activities, estimate DSFW during most active dates for each state, and assess DSFW time trends. Analytic results are important for machinery selection and acreage allocation. Software tools have been made available for readers to use in their own applied research.

INTRODUCTION

Farmers and researchers utilize fieldwork probabilities either explicitly or implicitly. Producers question if they can "get over" their acreage during the time window most conducive to the success of producing crops. Some will consider recent history and others will calculate coverage rate based on their specific machines, but both will likely include some additional time to account for adverse field conditions. Weather conditions such as rainfall and temperature impact the soil surface, thereby affecting the ability of machinery to conduct needed fieldwork during critical time windows. Evaluating days suitable for fieldwork (DSFW) can provide producers with input into machine and land management decisions.

Analyses of long-term DSFW data have been reported for individual states including Arkansas (Griffin, 2009; Griffin and Kelley, 2010), Illinois (Schnitkey, 2010), Indiana (Parsons and Doster, 1980), Iowa (Hannah and Edwards, 2014; Rosburg, Griffin, and Coffey, 2019), Kansas (Buller, 1992; Carls and Griffin, 2016; Williams and Llewelyn, 2013), Kentucky (Shockley and Mark, 2017), Mississippi (Spurlock, Buehring, and Caillavet, 1995), and Missouri (Massey, 2007), as well as across production regions for corn (Gramig and Yun, 2016; Irwin and Hubbs, 2018) and cotton (Bolton et al., 1968; Griffin and Barnes, 2017). An exhaustive search of the literature revealed no availability of peanut DSFW information suitable for farm management.

Several studies presented how farmers utilize fieldwork probabilities to determine optimal machinery sizing (Griffin, Buschermohle, and Barnes, 2015; Rosburg and Griffin, 2018; Schrock, 1976) and crop allocation (Kastens, 1997; Carpenter, Gerit, and Massey, 2012; Hannah, 2001). In peanuts, Jordan et al. (2018) conducted a survey of growers in Virginia, North Carolina, and South Carolina. The authors report that grower-respondents needed two days to dispense protectant products including fungicides and pesticides over approximately 250 acres per application. In total, each producer dedicated 18% of their time in the growing season to protectant application. This study builds upon Griffin (2009) and Griffin and Barnes (2017) by applying analyses specifically to peanut production plus providing software tools to assist researchers to conduct their own analyses. Griffin and Barnes (2017) evaluated DSFW specific to sizing planters and cotton pickers across 13 cotton producing states. Griffin (2009) provided step-by-step guidance in acquiring DSFW data from the United States Department of Agriculture (USDA) by using Arkansas as an example. Soil and weather conditions are essential to timely peanut field operations, especially harvesting. Adequate capacity was essential to the complete logistics of digging, harvesting, drying, and transportation (Meeks et al., 2005). Digging capacity for four- or six-row equipment has been estimated as 30–40 acres per day in ideal conditions and perfect field efficiency (Jordan et al., 2017). Harvest capacity has been estimated as 15–20 acres per day for four- and six-row pull-behind equipment. Advances in modern machine telematics allow specific working rates for machines and field processes to be calculated at increasing granularity and accuracy. Even with new tools to assess machine field capacity and field efficiencies, updated DSFW values created a context against which to compare the machine itself to its ability to perform in the larger production system.

The objectives of this analysis were to (1) update "most active" dates for peanut planting and harvest field activities, (2) calculate DSFW occurring within the most active date ranges for each peanut producing state, and (3) analyze collected DSFW data for trends over time. To supplement the objectives, a farm management example was described indicating how risk averse peanut growers may use these results obtained via modern software tools.

METHODS AND MATERIALS

The USDA National Agricultural Statistics Service (NASS) defines "most active" dates to plant and harvest specific crops as those days falling within the 15th and 85th percentile of reported crop progress (USDA NASS, 2010). A similar method was applied to extract the most active fieldwork period from regularly published annual survey data rather than rely on the decade-old "most active" dates reported by USDA NASS (2010) in a static report based on the previous 20 years of crop progress data. Using live data allowed the calculation of most active periods for states that were not previously reported as producing peanuts. Updated most active date ranges were determined from the most recent four years of available data, where available. The number of the calendar week marking the start and end of the most active dates for each state was determined using the same 15% and 85% crop completion criteria defined by USDA NASS. It should be noted that "most active" dates are not necessarily the best timing for highest yields, but when farmers are most actively conducting the selected operations.

DSFW data was collected for 11 states from 1995–2018 for planting and harvest. Days suitable and crop progress were reported weekly throughout the growing season and were cataloged as part of the annual survey datasets for their respective years. The described analysis retrieved data only after it was made available as part of an annual survey dataset. It should be noted that data was not available for two peanut producing states, Florida and Texas, prior to 2014. For each year, the number of weeks with DSFW available during most active times were evaluated to ensure that data was reported for each week. For each year, weekly DSFW were summed during most active planting and harvest dates. Resulting sums were analyzed and four descriptive plots were created for each peanut producing state. The four plots were a probabilistic analysis of DSFW per each week at the 15th, 50th, and 85th percentile; fieldwork progress for each week; and histograms representing the total number of DSFW available historically during "most active" planting and harvest windows.

The probabilistic analysis plot described variability in DSFW within and across growing seasons. Progress charts were standard data products the USDA produced weekly and were used in this analysis to visualize the most active period. The histograms were designed to indicate the historical flexibility in DSFW for each key field operation. A tight distribution indicated less flexibility than a wide distribution.

Annual trends in DSFW by state were evaluated to determine if significant changes in fieldwork days were detected over the 24-year period being analyzed. The linear trend of the data was assessed to determine if values of the variable in question increase, decrease, or remain unchanged over time. Specifically, the slope of estimated trend lines was examined to determine if they were statistically significantly different from zero during planting and harvest. Trend lines were estimated using ordinary least squares (OLS) in an R statistical environment (R Core Team, 2019).

If no change over time was found, more confidence exists in expecting a range of known DSFW for future years. However, if change was observed in the past, then expectation exists for potential changes along the same direction in the future. When the trendline slopes were not considered statistically significant, then the trendlines were interpreted to not be changing over time. When the null hypothesis that the estimated slope was not statistically different than zero was rejected, then the slope of the line was considered non-zero.

In addition to examining if trends were significant, structural changes were assessed by a Chow test (Chow, 1960) from contributed R package “strucchange” (Zeileis et al., 2002). Florida and Texas did not have sufficient data available and were therefore omitted from being evaluated by the Chow test.

The complete R script used in this analysis and resulting color plots are available for download as a GitHub repository (Griffin and Ward, 2019). The R script ingests the most recent data available; results may differ from those presented in this manuscript, because additional data is provided by USDA NASS. See the Appendix for additional information on specific commands used to access the data.

RESULTS AND DISCUSSION

Eleven U.S. states produce sufficient peanuts to be considered a “peanut producing state” such that USDA NASS reports data. For the 2018 production year, Georgia peanut farmers harvested 47.5% of the total U.S. acreage (Table 1) at 650,000 acres. The next two largest peanut producing states represent nearly one-fourth of the U.S. production. Alabama produced 11.8%, and Texas with 145,000 harvested acres produced 10.6% of harvested area. Of the 11 peanut producing states, New Mexico harvested the least area at 5,500 acres or 0.4% of total U.S. harvested area. North Carolina ranked fifth in harvested acres with 98,000 in 2018.

The most active time to plant peanuts in most states lasted three or four weeks. In North Carolina, the most active planting time lasted four weeks, while in Arkansas it lasted six weeks. Most states took six weeks to harvest during their most active period. The states with the shortest most active planting time had the longest most active harvest dates. In Arkansas, most active harvest time lasted six weeks, while in South Carolina it lasted eight weeks.

The most active planting times begin first in Arkansas and Florida during week 17 and last in New Mexico in week 20. All states finished the most active planting time in weeks 22–23. Most active peanut harvest begins first in Florida during week 38 and last in Oklahoma in week 42. In Florida, the most active peanut harvest dates end in week 42, the same week that Oklahoma most active harvest dates begin. Peanut producing states finish the most active harvest dates by end of week 46.

For each of the 11 peanut producing states, four plots were created with the software tool. As an application example, consider peanut field operations in North Carolina. Although only North Carolina results are presented, figures from all states are available at the project GitHub site (Griffin and Ward, 2019). Figure 1 displays long-term probability of observed DSFW at 15th, 50th, and 85th percentiles in North Carolina. For each week, the 15th (dotted green line), 50th (dashed red line), and 85th (solid black line) percentiles were presented representing the range of observed fieldwork days since 1995 for all states except Texas and Florida, for which data was not available before 2014. The y-axis ranges from 0–7, the number of calendar days per week. The x-axis is the week number expressed as week of year such that week number two begins on Sunday following January 1. Farm management decisions to allocate acreage to a crop or size equipment for target acreage can be made using information from this graph of fieldwork probabilities, particularly number of DSFW between the 15th and 50th percentiles. Variability over the calendar year was noted as DSFW was decreased at the beginning and ending of the field season.

Figure 2 depicts the empirical cumulative three-year average of when farmers planted (solid line) and harvested (dashed line) peanuts in North Carolina. Crop progress begins at 0% and ends at 100% completion, although the data usually ceased to be reported after 95% complete. The intersection of the horizontal lines at 15th and 85th percentiles with the empirical cumulative crop progress indicates the range of "most active" fieldwork. Some nonlinearities at extremities of reported data were observed, typically as data approached 100% complete. Percent completion data was compiled from field reports and may have been corrected if initial reports were overestimated. Functionally, the more linear portion between 15% and 85% completion was the most important part of the reported data and expresses to completion rate of fieldwork.

Figures 3 and 4 display histograms of the total number of DSFW during most active planting and harvest periods, respectively, for each year data was available. The y-axis indicates the number of years that had a specific number of days suitable during most active period. The x-axis reports the number of DSFW during the most active period. The y-axis label includes the number of years that data was available for the respective state (data for some states was omitted due to not reporting DSFW for all weeks for a given year during most active dates).

Over the 24 years of planting data in North Carolina, growers never had more than 25 days to conduct fieldwork (Figure 3). The most common number of DSFW for planting was 21–22 days, which occurred 7 out of the 23 years of available data. North Carolina farmers had more than 40 harvest work days only once during the 24-year data period (Figure 4). Most of the time producers had 30–35 days to conduct field operations during the most active peanut harvest times.

Peanut harvest is a complex, multi-pass series of field operations involving digging, desiccation, and harvest. Weather conditions during digging and before combining are correlated to both yield and quality. The modern peanut digger-shaker-inverter (DSI) is responsible for the first phase of peanut harvest. The DSI uses a sharp blade to fracture the soil around the pods and a shaker section, often a chain mechanism, to lift the peanut pods from the soil and shake off as much soil as possible. Finally, the DSI will invert the peanuts so the pods face up and deposit the peanut vines and pods into windrows. Inversion of the peanuts allows separation of the pods from the soil and allows air circulation to improve the field drying or curing phase. Windrows are formed typically between two to seven days, to dry without necessitating forced air drying and improve threshing performance during combining. Windrows require additional management if precipitation occurs after digging or if soil conditions were wet during digging. Wet or muddy windrows are "lifted" or "fluffed" to expedite drying, which increases risks of reduced harvestable yield due to shaking pods loose from the vines. In addition, pod quality is adversely impacted from excessive moisture. Weather conditions similar to that needed for fieldwork are advantageous for in-field drying. Experiencing DSFW during the critical time between digging and combining is important to protecting yield and quality. Therefore, some of the available DSFW for harvest is committed to in-field drying and not just operating equipment in the field.

Changes in Fieldwork Probability Over Time

Results of planting and harvesting trend analysis are presented in Table 2. There were no significant trends in the total number of days available for fieldwork since 1995 in all peanut producing states, including both planting and harvest. Trendline slopes were tested but none were statistically different from zero at any conventional confidence level. As an example, the OLS trendline slope of North Carolina planting DSFW from 1995–2018 was estimated as −0.09 but was not statistically significantly different from zero. In this example, it was not expected that North Carolina had any fewer or additional DSFW in the past as it does in the present. Time trends were tested, and no structural changes were detected for any states during planting or harvest time periods. Therefore, no substantial trend or structural breaks in DSFW were observed over the 24-year time period.

FARM MANAGEMENT IMPLICATIONS

Variability in DSFW has farm management implications. Using North Carolina DSFW data and conservative parameters from Jordan et al. (2017), a hypothetical example is described under a range of observed weather with respect to peanut acreage that can be planted and harvested with typical equipment on 100 acres. The equipment performance rates for an equipment complement are estimated assuming a 10-hour workday. Row spacing and ground speed will change estimated equipment performance rates; these estimates do not include additional time allowances for transport of equipment among fields. Tables 3 and 4 present minimum, maximum, and specific percentiles of DSFW. These values can be compared to calculated equipment coverage rates to determine if an operation has enough machine capacity.

The rules of thumb for a four-row equipment complement estimate three days for digging and an additional six days for combining 100 acres. Windrow drying between these field operations could range between two and seven days. In practice, harvest field operations are likely concurrent with other field operations, meaning that digging is occurring a few days ahead of combining and some fields are drying as others are being combined. In total, all harvest field operations could require from 11–16 days to harvest 100 acres. During the six-week harvest time, North Carolina peanut growers had at least 19.3 DSFW (Table 4). The most DSFW observed in North Carolina was 39.5 days. The median DSFW was 31.9, while the 15th percentile was 26.5 (Table 4). Producers in North Carolina estimated that they spent 15 days to dig and 25 days to harvest during the 2017 growing season (Jordan, 2018). The total of 40 estimated days for harvest fieldwork put the producers in the position needing all of the historically available field days to complete their fieldwork.

Equipment performance rates and the calculated DSFW for different levels of weather risk indicate that a four-row equipment complement is adequate for a hypothetical 100 acres of peanuts even with exceptionally few DSFW. A total of 200 acres would fall at the upper edge of the equipment range even at the median number of DSFW. Some or part of the equipment complement could be sized up to six-row to create some additional capacity, or a second four-row combine could be added—which would increase capacity in the slowest field operation and help protect from the loss of working days as a result of machine failure if only one combine were available. Harvest date decisions require producers to decide between expected weight gain in immature pods and yield loss from shedding mature pods. Yield penalty from not harvesting at optimum maturity is highly variable among cultivars and years, so specific yield penalties are difficult to generalize since maturity must be assessed discreetly. Sizing equipment complements should include capacity to harvest as close to optimum as possible, so excess harvest capacity may be justified.

CONCLUSIONS

Publicly available data can be mined for useful farm management information. Free, open-source technology tools and scripted data analysis can allow for rapid visualization of useful data—in this case the number of days available for fieldwork. Weather uncertainty impacts farmers' decisions regarding acreage and equipment complements. Knowledge of weather probabilities, as represented by DSFW, allows farmers to improve their ability to make optimal decisions regarding peanut acreage, planters, and digging equipment. Over long periods of time, no discernible trends in increased or decreased numbers of days to plant or harvest peanuts were detected. Therefore, peanut growers can expect the yearly DSFW to be within the range of previous observations.

Most active fieldwork times were calculated for each of the 11 peanut producing states by observing when producers were between 15% and 85% complete with field operations. Most active days ranged widely among states, starting between weeks 17–20 and ending between weeks 22–24 for planting. Harvest most active days started at weeks 37–42 and ended at weeks 42–46.

Crop progress reports within the most active days for fieldwork were used to calculated DSFW for each of the 11 peanut states. The results varied across states and based on the selected probability distribution. The key point was to not size equipment so that field capacity is at the maximum DSFW. Equipment complements decisions should include some amount of weather risk. Given negligible change over time, historically calculated state-specific DSFW allows better estimation of risk.

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APPENDIX

The full R script used in this analysis is available as a GitHub repository (Griffin and Ward, 2019).

The three required contributed packages to R, usdarnass, tidyverse, and strucchange, are called in lines 5, 6, and 7 (Figure A). The lower and upper bounds for Figure 1 are set in lines 9 and 10. The user can change these to other levels such as the 25th and 75th percentiles by changing the 0.15 and 0.85 to 0.25 and 0.75, respectively. Future researchers may desire for the analysis to include data from the most recent years. In that case, the currentYear parameter in line 11 should be changed from 2018 to the year of most recently available planting and harvest data. The "most active" dates have been assumed to be the 15th and 85th percentile crop progress. The analyst may decide to widen or restrict these ranges and can do so by changing the parameters in lines 12 and 13.

Users must request an API key from USDA NASS to enter into the R script on line 15 before gaining access to data (Figure B). Lines 17 to 19 are likely the most efficient script to access the number of harvested peanut acres since 2014 at the state level. Data for earlier years is available and can be requested by replacing the 2014 with another year. The ">=" before the year is interpreted as "greater than or equal to" such that 2014 was included in the data request. Other crops could be requested by replacing "PEANUTS" with the crop such as "COTTON" (however, it should be noted that other minor differences may require the analyst to update other portions of the script).

Lines 21 to 30 format the data. Line 21 subsets the data to only include the current year (set to be 2018 in line 11). Line 22 removes commas as thousands place in numbers. Line 23 forces all numbers to be interpreted as numbers. Line 24 creates a new variable calculated as percent of total harvested acres. Line 25 creates a new data frame named "dat2" from the four columns. Line 26 instructs the new data frame to be interpreted as a data frame. Line 27 assigns names to each data column. Line 28 creates a new data frame and omits rows of data where state name was "Other States." Line 29 creates a data column as rank of U.S. total acreage. Line 30 saves the data as a *.csv file named "dat4table1.csv."

Figure 1 in the text was created by lines 94 to 106 using ggplot() function from ggplot2 contributed package to R (Figure C). The ggplot2 package is part of the tidyverse set of packages, so it was not required to call it individually in the first few lines of the R script. Lines 95 to 97 instruct the software to create a line graph with numerical week of year on the x-axis and value (DSFW per week) on the y-axis, grouped as the percentiles set in lines 9 and 10 plus the median 50th percentile. Line 105 saves the graph as “graph.png.”

```
 4 # installs required packages
 5 library(usdarnass) # negates necessity for API
 6 library(tidyverse) # ggplot() and gather()
 7 library(strucchange) # Chow test
 8
 9 min.prob<-0.15 # lower bound DSFW, a "bad" year,  FYI 0.50 is median
10 max.prob<-0.85 # upper bound DSFW, a "good" year
11 currentYear<-2019 # ignores 2020 for now
12 begin=15 # percent progress of beginning of most active dates
13 end=85 # percent progress of ending of most active dates
```

Figure A. R Code to Call Contributed Packages and Set Parameters

```
nass_set_key(key = "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX", overwrite =
FALSE) #replace XXXX with key

peanutHarvest<-nass_data(year=">=2014", agg_level_desc = "STATE",
                         short_desc = "PEANUTS - ACRES HARVESTED",
                         reference_period_desc = "YEAR")

dat<-subset(peanutHarvest, year==currentYear)
dat$value<-as.numeric(gsub(",", "", dat$Value))
dat$value<-as.numeric(dat$value)
dat$percent<-round(dat$value/sum(dat$value)*100,1)
dat2<-cbind(dat$state_name,dat$value, dat$percent, dat$state_fips_code)
dat3<-as.data.frame(dat2)
colnames(dat3)<-c("State", "acres", "PercTotal", "STATE_FIPS")
dat4<-subset(dat3, State!= "OTHER STATES")
dat4$Rank<-rank(-as.numeric(as.character(dat4$acres)))
write.csv(dat4,"dat4table1.csv")
```

Figure B. R Code for Accessing USDA NASS Data via API

```
 94 ggplot() +
 95     geom_line(aes(x=dat4DSFW$WOY, y= dat4DSFW$value,
 96     group=dat4DSFW$variable,  linetype=dat4DSFW$variable,
 97     color=dat4DSFW$variable), size=1.) +
 98 scale_y_continuous(breaks = round(seq(0, 7, by = 1),1), limits=c(0,7)) +
 99 xlim(0, 52) + guides(fill=guide_legend(title=NULL)) +
100 labs(y="Days per week", x="Week of year", caption="Source: USDA NASS") +
101 labs(colour = "Percentile") +
102 scale_color_manual("", values=c("darkgreen", "darkred", "black")) +
103 scale_linetype_manual("", values=c("dotted", "twodash", "solid"))+
104 theme_bw()
105 ggsave(paste("1DSFW", state, "graph.png", sep=""), width=6, height=4,
106 units="in", dpi = 600)
```

Figure C. R Code for Creating Figure 1

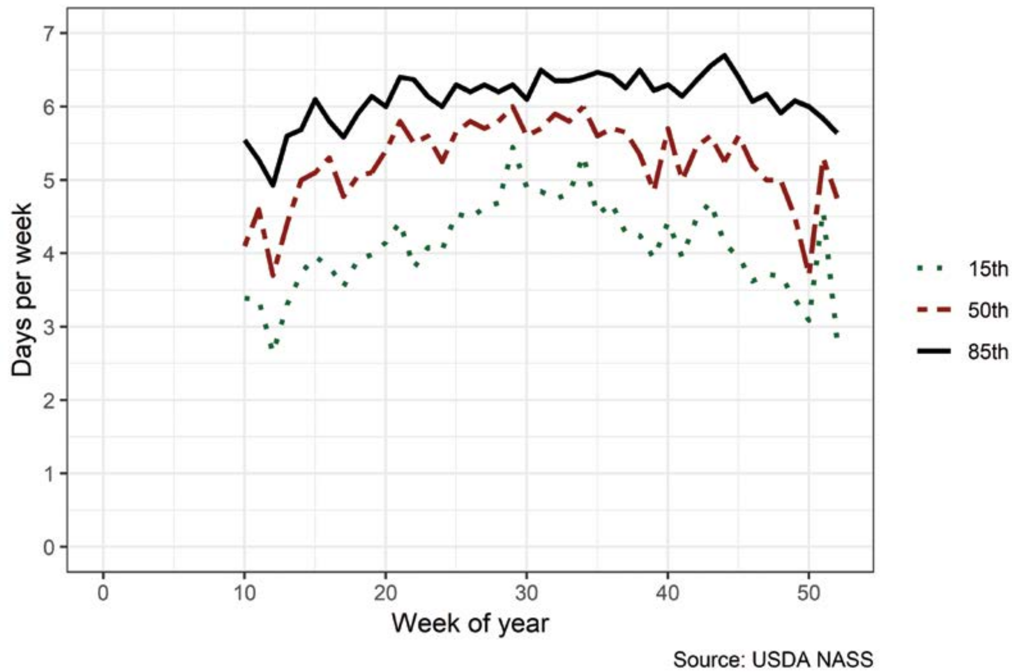

Figure 1. Long-Term DSFW Percentile by Week of Year in North Carolina (1995–2018)

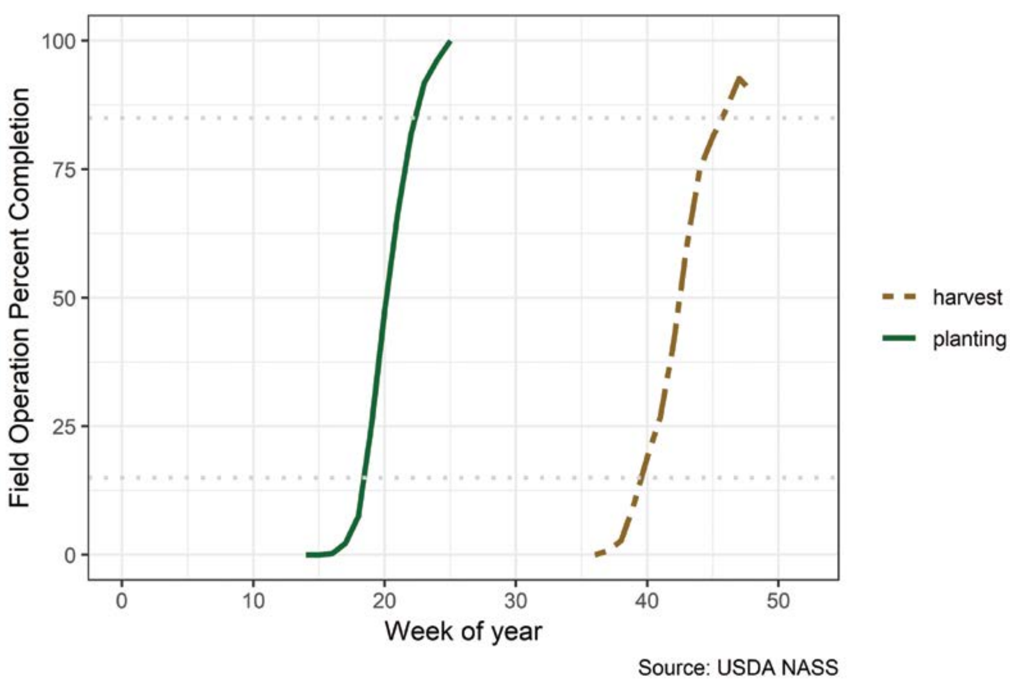

Figure 2. Empirical Average North Carolina Planting and Harvest Fieldwork Progress by Week of Year (2015-2017). Note: Most active fieldwork days occurred between the 15th and 85th percentile of fieldwork completion.

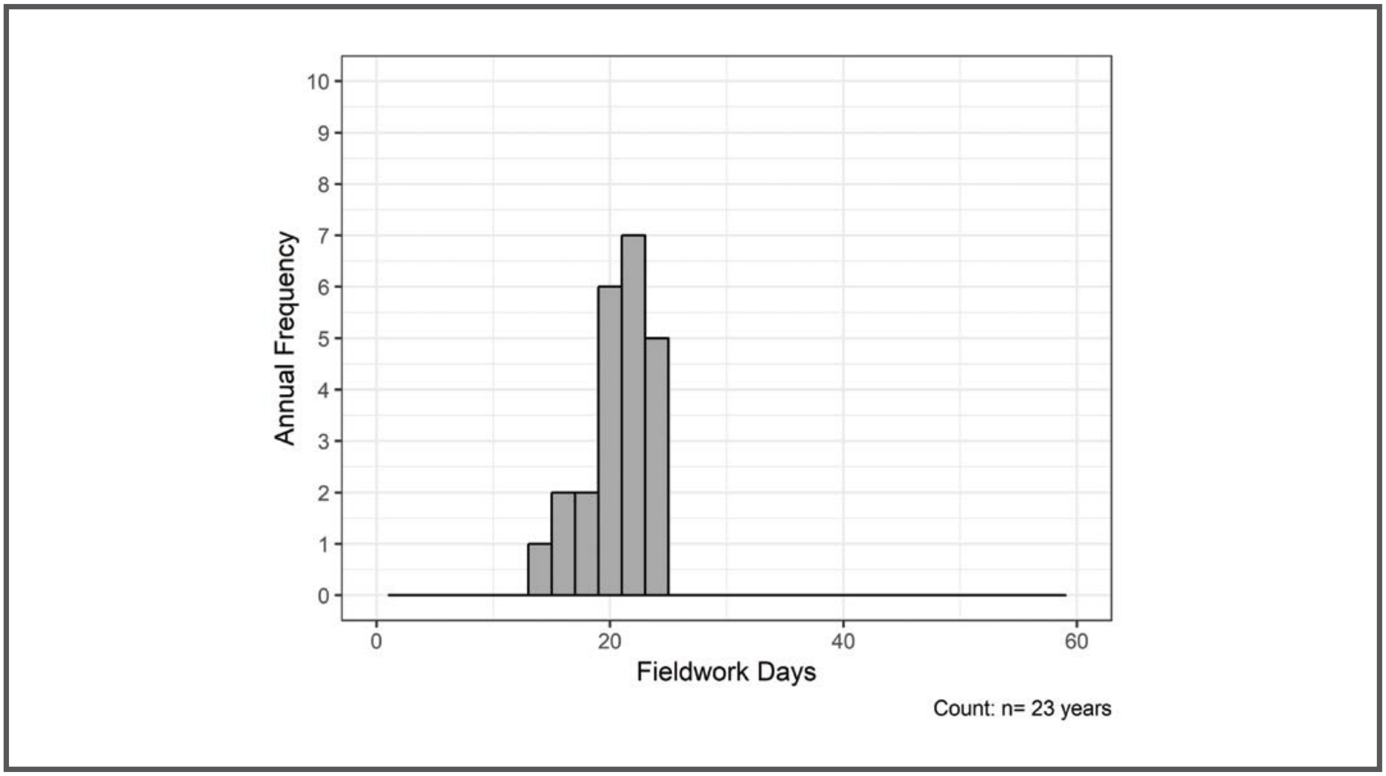

Figure 3. Number of Fieldwork Days During Planting in North Carolina (1995–2018)

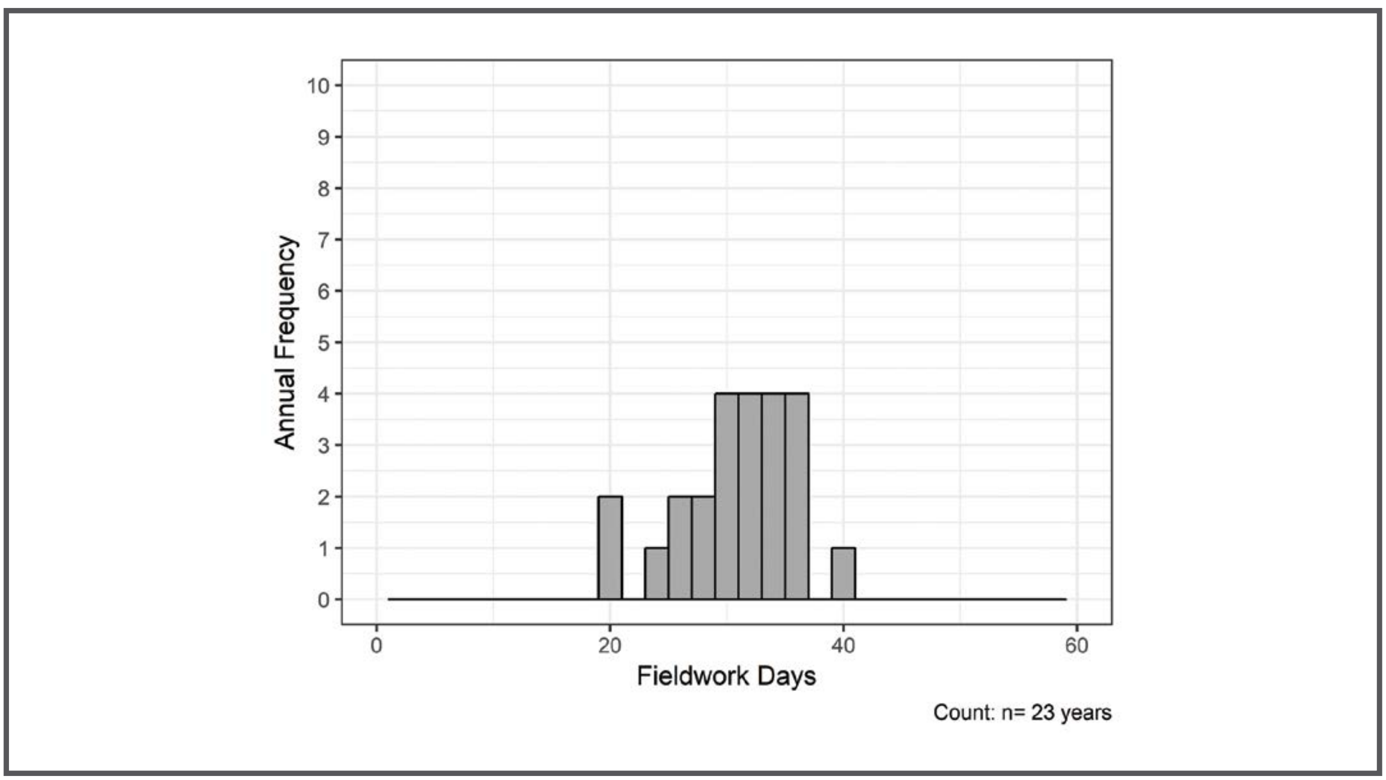

Figure 4. Number of Fieldwork Days During Harvest in North Carolina (1995–2018)

Table 1. 2018 USDA NASS Harvested Acreage and Most Active Fieldwork Dates							
State	Area Harvested (Acres)	Rank	% U.S. Total	Begin Plant	End Plant	Begin Harvest	End Harvest
				Calendar Week[a]			
Alabama	162,000	2	11.8	18	23	39	45
Arkansas	23,000	9	1.7	17	22	40	45
Florida	140,000	4	10.2	17	21	38	42
Georgia	650,000	1	47.5	18	22	39	45
Mississippi	24,000	7.5	1.8	18	23	39	45
New Mexico	5,500	11	0.4	20	24	41	47
North Carolina	98,000	5	7.2	19	22	41	46
Oklahoma	15,000	10	1.1	18	22	42	46
South Carolina	82,000	6	6.0	19	22	40	47
Texas	145,000	3	10.6	19	22	41	47
Virginia	24,000	7.5	1.8	19	22	40	44

[a]Numerical calendar week; week 2 starts the Sunday after January 1.

Table 2. Slope of Cumulative DSFW During Most Active Field Operations (1995–2018)				
State	Planting		Harvest	
	Slope	p-Value	Slope	p-Value
Alabama	−0.08	0.60	0.15	0.48
Arkansas	−0.23	0.11	−0.10	0.57
Florida	−0.55	0.39	0.21	0.43
Georgia	−0.07	0.42	0.11	0.44
Mississippi	−0.04	0.77	0.03	0.91
New Mexico	−0.07	0.35	0.13	0.29
North Carolina	−0.09	0.32	−0.03	0.81
Oklahoma	0.00	0.99	0.18	0.29
South Carolina	−0.10	0.11	−0.04	0.79
Texas	1.96	0.34	−1.20	0.60
Virginia	0.00	0.99	−0.07	0.56

Table 3. Historic Number of Days Suitable by Percentile for Peanut Planting (1995-2018)					
State	Percentile				
	Min	15th	50th	85th	Max
Alabama	17.5	27.4	32.3	35.7	40.2
Arkansas	19.9	24.0	29.0	32.6	39.6
Florida	27.8	29.4	31.7	31.8	31.9
Georgia	22.0	24.7	28.3	30.1	32.9
Mississippi	21.2	23.6	29.8	33.5	36.6
New Mexico	25.2	30.8	33.5	34.1	34.9
North Carolina	14.1	17.6	21.4	23.5	25.0
Oklahoma	11.2	18.7	25.1	28.9	30.2
South Carolina	17.6	20.5	23.5	24.4	25.3
Texas	11.3	16.2	22.2	24.4	26.0
Virginia	12.2	15.5	20.1	22.8	25.1

Table 4. Historic Number of Days Suitable by Percentile for Peanut Harvest (1995-2018)					
State	Percentile				
	Min	15th	50th	85th	Max
Alabama	24.1	31.1	39.4	43.5	48.2
Arkansas	19.5	25.1	34.2	37.0	41.0
Florida	30.1	30.4	30.7	31.3	32.0
Georgia	29.6	31.9	40.2	42.9	45.9
Mississippi	15.8	28.0	37.6	42.1	45.8
New Mexico	33.1	39.0	45.8	46.9	48.4
North Carolina	19.3	25.8	31.7	35.5	39.5
Oklahoma	12.4	18.9	28.2	31.4	33.1
South Carolina	30.2	38.3	45.6	49.6	51.0
Texas	29.6	33.3	40.4	43.0	45.2
Virginia	16.2	23.4	26.0	30.4	33.6