

AGRICULTURAL JOB MARKET REPORT

December 2023 Report



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Executive Summary

PURPOSE

Purdue University's Department of Agricultural Economics started collecting data on agricultural job postings during the summer of 2021. This data is collected every 4 weeks, and this report represents an overview of the agricultural job market over time. The data extends from June 2021 to January 2024. The Agricultural Job Market Report provides a measurement of the current state of agricultural job openings. To wrap up the second full calendar year of data collection, we will include long terms trends going back to the June 2021 as opposed to just the previous 12 months. Previous supplemental sections will also be revisited to evaluate changes over time.

ABOUT THIS REPORT

Google's job search engine pulls job postings from thousands of separate job boards. These job boards can be company specific as well as common job posting sites like LinkedIn and Glassdoor. On Google's job search engine, LinkedIn is the most popular job board for agricultural jobs that are found in the data.

JOB TRENDS

Agricultural Job postings were collected 34 times between June 16, 2021, and January 4, 2024. On average, there are 2845 new job openings every four weeks. There were 2765 new job openings on Google between November 29, 2023, and January 4, 2024. Current job postings and opening have now decreased three collections in a row.

SALARY

The average agricultural job salary since June 2021 is \$52,482, which is below the average salary for all jobs in the United States, according to Forbes. On January 4, 2024, Jobs in lending and finance, economics, and research are among the highest paying jobs in agriculture. Additionally, jobs in the West had the highest average salary followed by remote jobs.

DESCRIPTION ANALYSIS

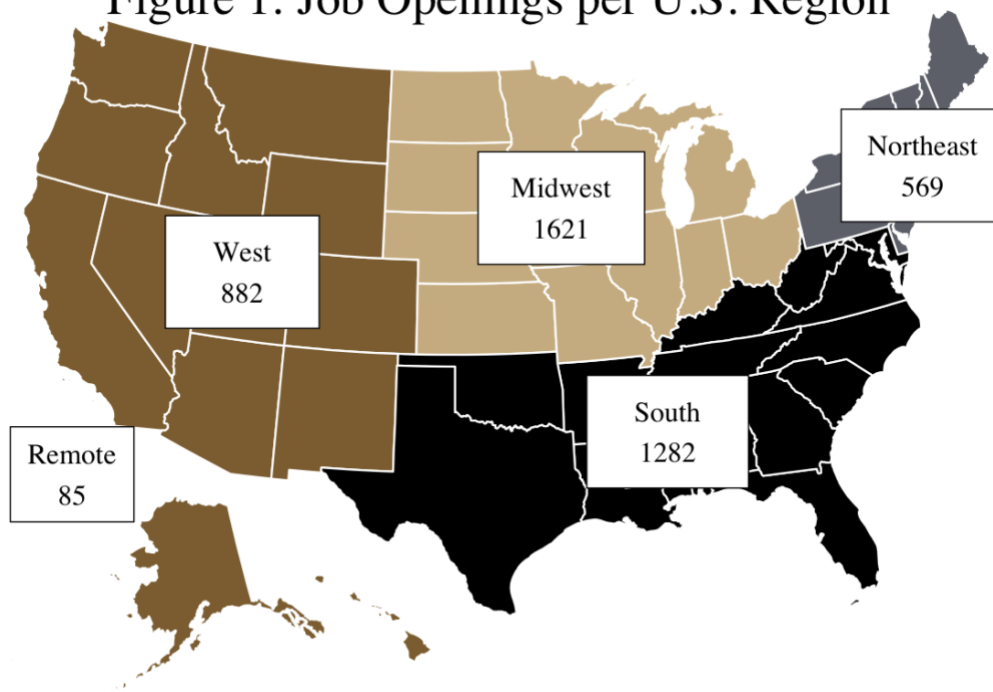
Experience is mentioned in the description 90% of agricultural job making it the most common requirement on January 4, 2024. The most common types of job openings lending and finance, natural resources, and research. New internship positions as a percent of total new jobs have again increased following a decline in September and October.

Job Postings and Openings

In the report, “job posting” refers to any separate occurrence of a job advertisement for an individual job. Any representation of a single specific job opportunity of a company will always be phrased as a “job opening”. Some companies have existing career pages on their website but continue to post to job boards, like LinkedIn and ZipRecruiter. Companies post to multiple job boards to cast a wider net for potential hires.

Figure 1 illustrates the amount of job openings for each region of the United States. There were 4637 total job postings for 4439 unique jobs on January 4, 2024. The most jobs openings were in the Midwest and South. Over one third of all job openings were in the Midwest. Relative to the collection on November 29, 2023, remote jobs openings increased, while job openings in each geographical region decreased. The ranking of regions in terms of total job openings was the same in the two most recent collections.

Figure 1: Job Openings per U.S. Region



Data Source: Google Job Search (January 2024)

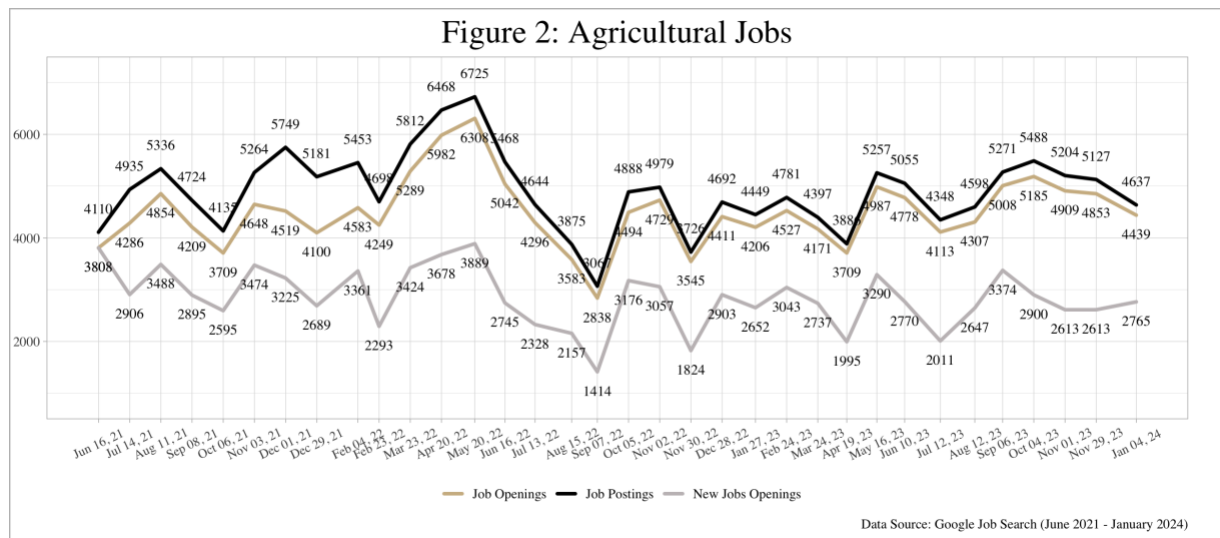
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Job Trends

Figure 2 represents job posting collections for every four weeks from June 16, 2021, to January 4, 2024. On average, there were 2845 new openings present every four weeks. New postings have been below this average for the past three collection periods, but January saw the first increase in new jobs postings since September. There are limited long term trends with new openings varying from month-to-month over the last two and a half years. They peaked at 3889 new openings in May of 2022 and quickly decreased to 1414 new openings in September 2022.

On average, there were 4490 job openings at each collection date. On January 4th there were only 4439 unique job openings. This followed consistent decreases in openings since October 2023, and represents the first time since August 2023 that total openings are below the long-term average. A few loose long-term trends can be found in the job opening data. The data started with a period of increase from June 2021 reaching the long-term maximum for the data in May 2022 before spiking to long-term minimum in September 2022. Opening again increased over a year long period from September 2022 to October 2023.

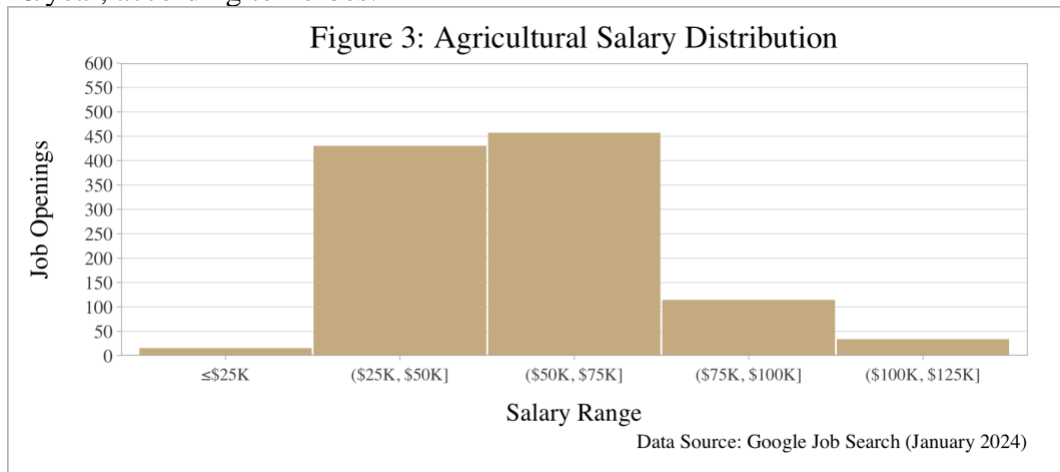
The average number of job postings in each period was 4894. The long-term trend closely followed the number of job openings, but it may be more interesting to evaluate the posting in terms of postings per opening. Over the two and a half years, the average postings per opening was 1.09, but since November of 2022, postings per opening have stayed between 1.04 and 1.07. The long-term average is driven up by the period between July 2021 and March of 2022 when the ratio was always at least 1.1 and peaked at 1.26 and 1.27 in December of 2021. During this time companies were more commonly posting jobs on multiple jobsites to aggressively try and fill open positions.



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Salary

The national median salary computed for the last 18 months was \$46,363/year, and the average salary was \$52,482/year. It is important to note that only 18% of job openings included salary information. Figure 3 illustrates the distribution of salary among agricultural job openings for January of 2024. According to ZipRecruiter, the national average salary for agricultural related jobs is \$47,486/year. The average salary for all occupations is \$59,428/year, according to Forbes.



SALARY BY SUBSECTOR

The distribution of salaries varies across the different subsectors of agricultural jobs, as shown in Table 1. Jobs in lending and finance (\$57,856/year), economics (\$57,406/year), and research (\$56,849/year), have the highest average salary. Food science jobs had the lowest average income with an annually salary of \$50,370. It is important to note that jobs can fall in multiple subsectors. It is also possible that specific subsectors exclude salaries more often or have salaries that are excluded as outliers.

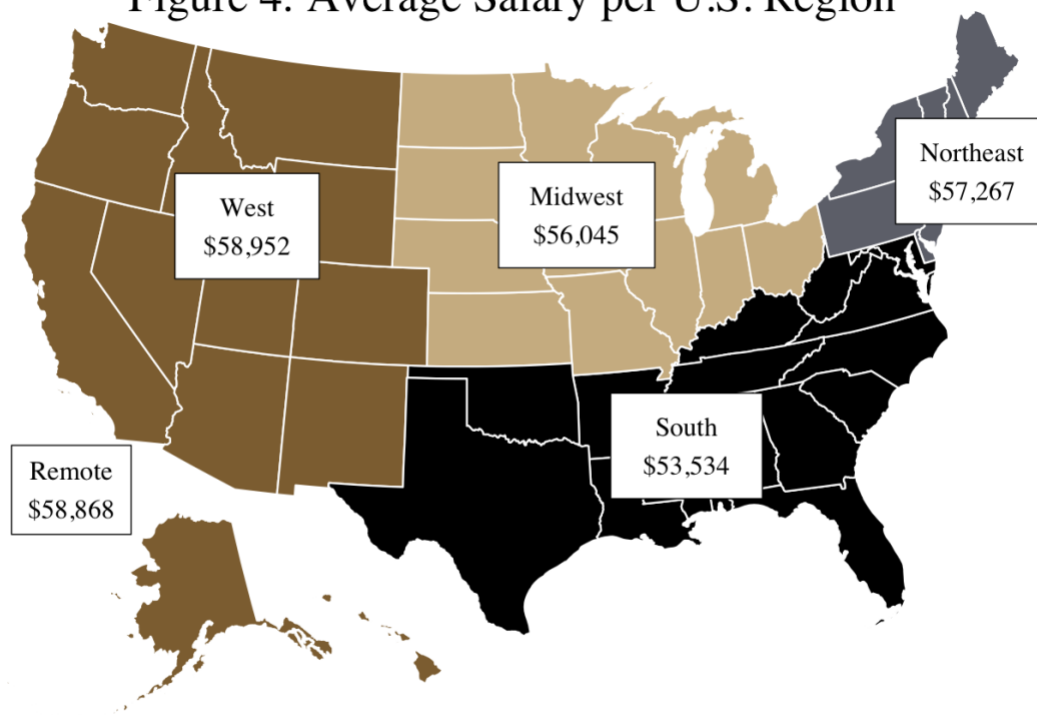
Table 1 Job Salary by Subsector	Average Salary	Median Salary
Academic	\$52,541	\$52,925
Agricultural Economics	\$57,406	\$57,118
Agricultural Education	\$55,289	\$56,528
Agricultural Engineering	\$55,506	\$54,467
Agricultural Sales	\$54,896	\$51,362
Agronomy	\$54,529	\$55,000
Animal Science	\$55,488	\$57,118
Farming	\$55,112	\$56,130
Food Science	\$50,370	\$48,762
Lending and Finance	\$57,856	\$57,118
Natural Resources	\$54,403	\$54,421
Research	\$56,849	\$57,118
Google Job Search (January 2024)		

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SALARY BY REGION

Average salaries vary by region. Figure 4 illustrates the variation in average salaries across the U.S. Fully remote jobs have the an average salary at \$58,868/year. The West has the highest average regional salary listed in job postings at \$58,952/year, followed by the Northeast at \$57,267 /year. The third highest average salary by region is the Midwest at \$56,045/year, followed by the South at \$56,045/year. Relative to the average regional salaries in November, every geographic region saw average salary increase while average salary of remote jobs decreased. Additionally, average salaries in the West were previously below those in the Northeast.

Figure 4: Average Salary per U.S. Region

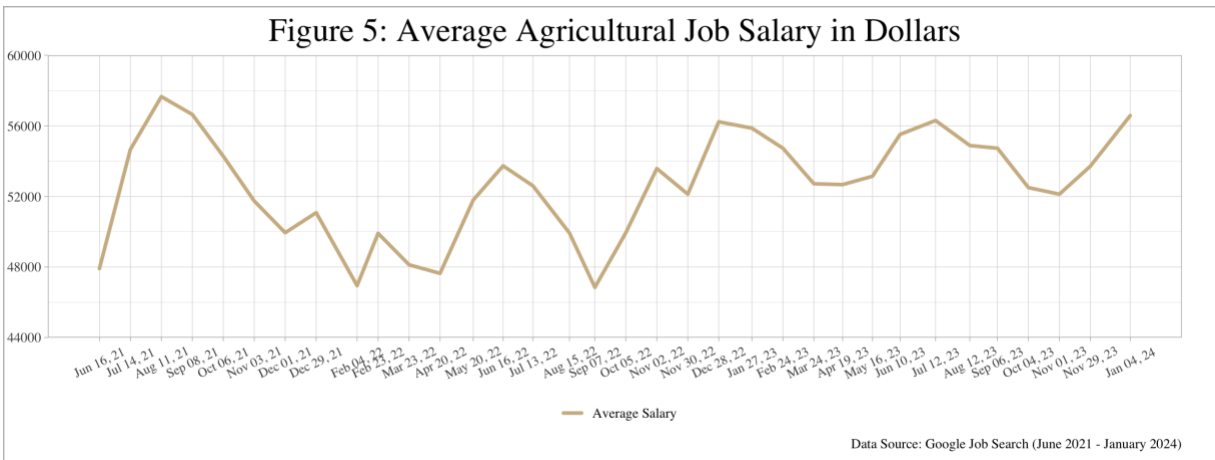


Data Source: Google Job Search (January 2024)

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SALARY TRENDS

The average salary for observed agricultural jobs over the collection period are depicted in Figure 5. Salary labels are excluded from the graph for visibility. Removing outliers, the highest average salary at any collection point occurred in August 2021 at \$57,657/year. The minimum was \$46,845/year in September 2022. Since November 2022, average salary has not fallen below \$52,137/year, which has been consistently higher than the previous 12 months from November 2021 to October 2022.



Description Analysis

INDUSTRY SUBCATEGORY

The data can be grouped by mentions within job descriptions. Based on company type or job responsibilities, it is possible for a job to fit in multiple different subcategories. For example, if a job on a farm requires feeding animals and operating machinery, it would be both animal sciences and farming.

Table 2 reports the percent of job openings that include each word or some variation of it. The top three subcategories are lending and finance, natural resources, and farming. Academic jobs are the least common job type.

Table 2 Industry Subsector	Job Openings that Mention
Academic	3.20%
Ag Education	34.70%
Agronomy	49.70%
Animal Science	45.00%
Economics	28.90%
Engineering	51.40%
Farming	65.40%
Food Science	23.80%
Lending and Finance	72.80%
Natural Resources	72.10%
Research	60.20%
Sales	58.80%
Google Job Search (January 2024)	

REQUIRED SKILLS

Table 3 shows the average percentage of mentions for specific job requirements. Experience is required by 89% of jobs, while over 50 percent of jobs also require leadership, communication, education, travel, and teamwork. The required skills and experiences are found across multiple different subsectors of agricultural jobs. Throughout span of the data collection, experience has always been the most common requirement. Mentions of education peaked in August 2021 (79%) before consistently decreasing until October 2022 (55%). Education mentions have not increased above 28 percent since.

Table 3 Requirements	Job Openings that Mention
Communication	72.7 %
Critical Thinking	15.86 %
Data	28.93 %
Education	64.86 %
Experience	89.75 %
Leadership	74.7 %
Microsoft	44.65 %
Programming	10.52 %
Public Speaking	36.36 %
Quantitative	29.15 %
Remote Work	14.28 %
Teamwork	54.25 %
Travel	59.83 %
Google Job Search (January 2024)	

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DESIRED EDUCATION

Table 4 reports the percent of jobs postings in agriculture that mention each desired level of education by applicants. To be included, the educational term must be explicitly written in a job description. It is possible for a job to mention multiple levels of education. Generally, a low share of agricultural jobs indicates a required education. According to Table 4, a high school degree, the most cited degree requirement, is mentioned in 18% of agricultural job postings. The mentions of bachelor's and master's degrees were much more prevalent in 2021, starting at 29% and 26% in June, respectively. Since February 2022 mentions of bachelor's degrees have averaged 16% and mentions of master's degrees have averaged 8%.

Table 4 Desired Education	Job Openings that Mention
High School	18.47 %
Associates	2.66 %
Bachelors	13.99 %
Masters	9.66 %
PhD	7.46 %
Google Job Search (November 2023)	

JOB BENEFITS

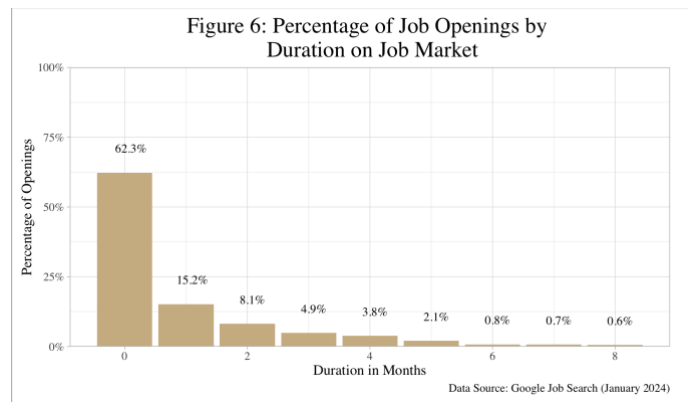
The key terms related to job benefits are in Table 5. These include the broad terms of benefits, diversity, equal opportunity, tuition reimbursement, and 401(K). In the same way companies may not post salaries with online listings, they may also not report all the relevant benefits. These numbers should serve as guides to understand what is being displayed in job descriptions but are unlikely to fully capture the benefit packages offered by agricultural employers. We can see that most agricultural job postings use some general terms of benefits in the description, but few references specific benefits such as 401(K) and tuition reimbursement. Additionally, 87% of jobs included mention of equal opportunity. These levels of mentions have maintained relative stability throughout the duration of data collection.

Table 5 Benefits	Job Openings that Mention
401(K)	9.57 %
General Benefits	67.04 %
Diversity	27.19 %
Equal Opportunity	86.98 %
Remote	14.28 %
Google Job Search (November 2023)	

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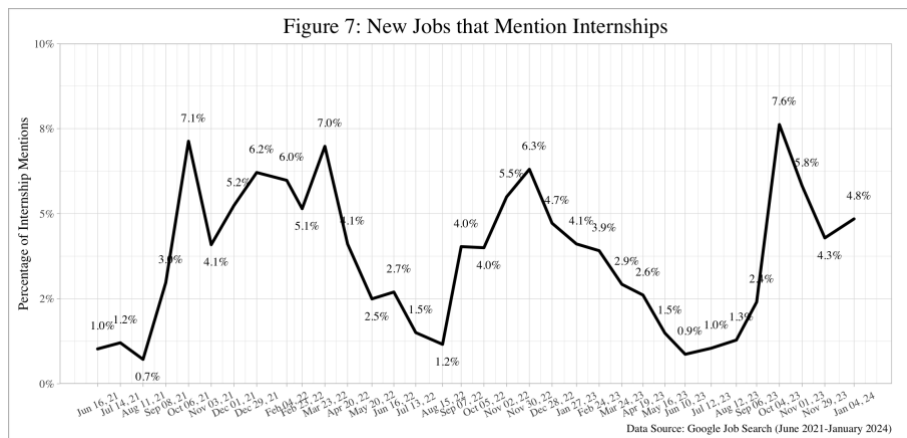
DURATION ON JOB MARKET

The amount of time that a job opening is listed can be an indicator of how fast agricultural jobs are filled and how long agricultural employers search for potential candidates. Figure 6 shows the duration current job opening have been on the market. 62.3% of agricultural jobs were not present in the prior scrape, while 85.6% of job opening are less than three months old.



NEW INTERSHIP OPENINGS

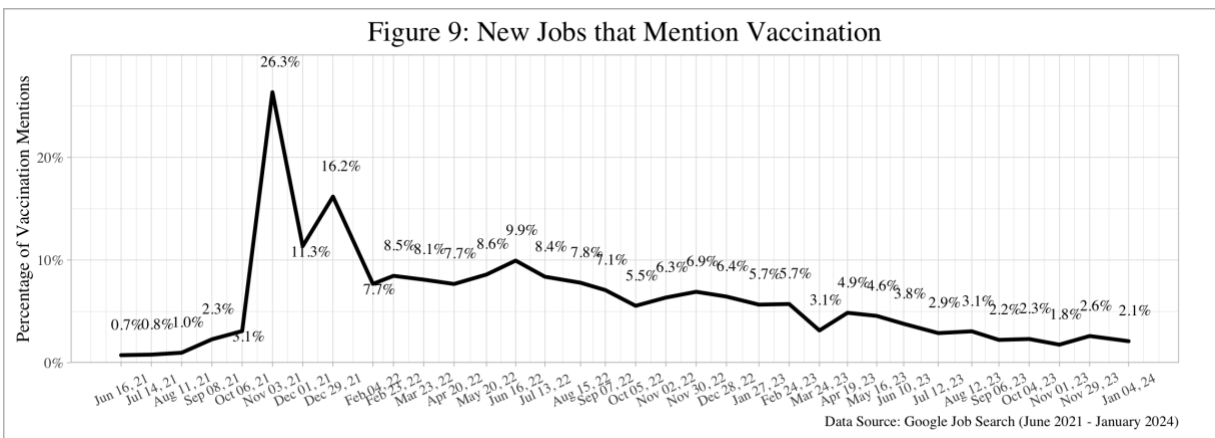
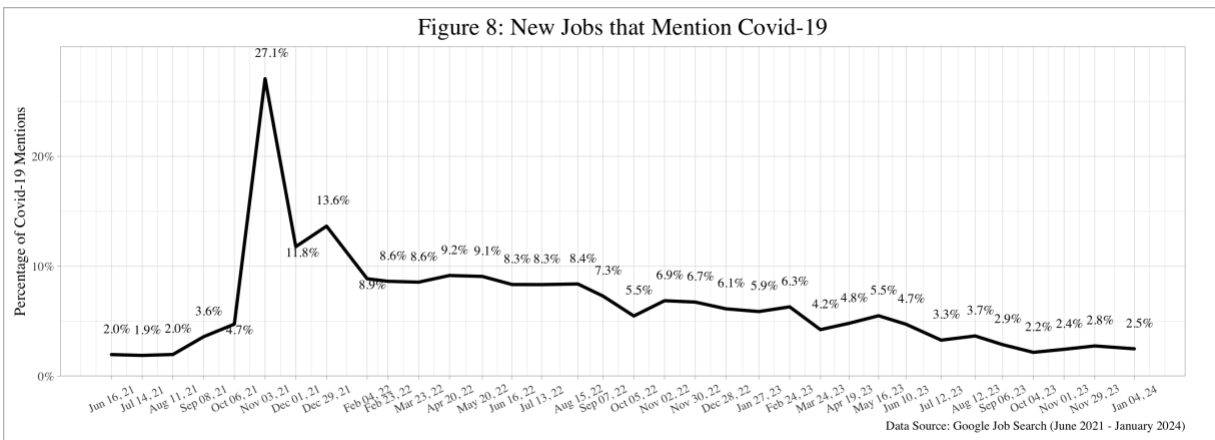
Internships are often filled by current college students that are looking to gain experience for their future career or meet a degree requirement. As a result, these types of job openings often follow the academic calendar. Figure 7 shows the percent of new jobs that mention internship between June 2021 and January 2024. Internship mentions are cyclical, increasing in the fall as companies seek students to employ and slowly decrease as the summer positions are filled. During the 2022-2023 academic year, there was only one peak in the fall, while a fall and spring peak existed during the 2021-2022 academic year. It is possible that there will be a fall and spring peak this academic year, but that will be more visible by February or March.



Covid Impact

MENTIONS OF COVID AND VACCINATIONS

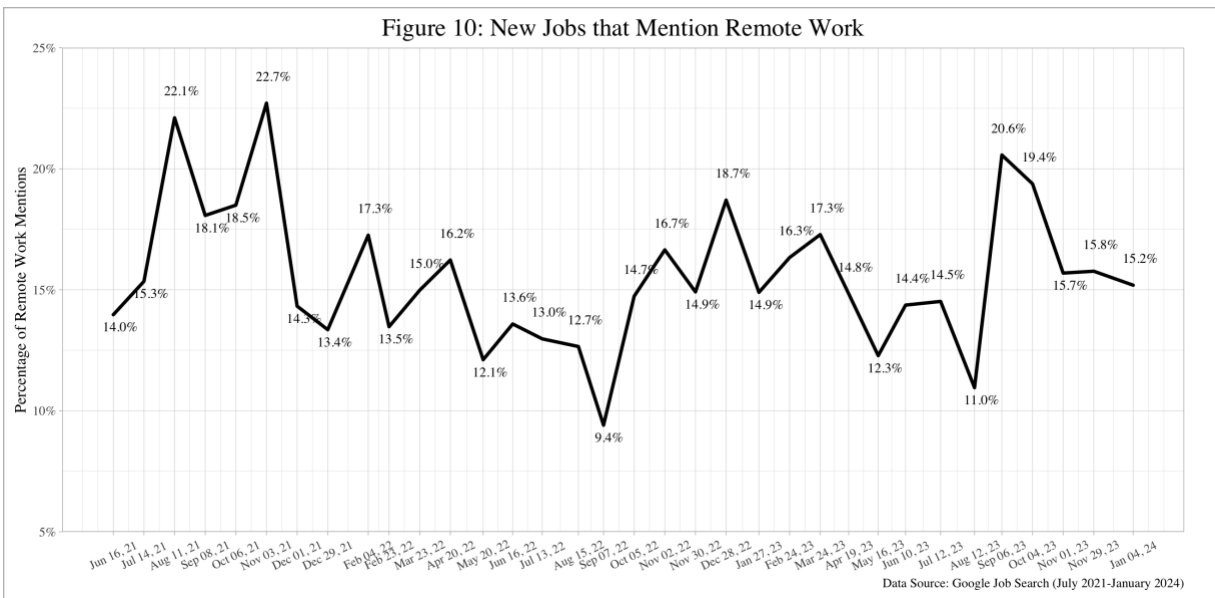
At the beginning of 2020, the Covid-19 pandemic disrupted in-person and office-based work. As a result, companies were forced to cut job positions or make positions virtual. The impacts of Covid-19 have continued to be seen, including in the job market. Figure 8 depicts the trend of covid mentions in the job descriptions throughout the data collection period. Mentions of covid spiked to 27.1% in November 2021 from 4.7% in October. Since November 2021, the percent of new jobs that mention Covid have consistently decreased. Covid mentions have settled between 2 and 3 percent since September 2023. To fight the pandemic, vaccines became available in December 2020. Like Covid, companies began mentioning the vaccine in descriptions of job postings. Some companies even required Covid vaccines as employees returned to work. Figure 9 depicts the trend in new job openings that mentioned the Covid-19 vaccine. It follows a very similar trend to Covid-19 mentions peaking in November 2021 before consistently decreasing.



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REMOTE WORK

One large impact of the pandemic that remains is the idea of remote work. To slow the spread, companies that were able to work remotely pushed for the safer alternative of tele-work. Though the pandemic has ended, the benefits of and opportunity for remote work have continued. Figure 10 depicts the percent of new jobs in each collection that mention remote work. Mentions of remote fluctuate from collection to collection. Unlike, Covid and vaccination mentions, there has not been a consistent decrease 2021. In November 2023, new jobs mentioning remote work decreased following a two-month spike in September and October 2023. Remote mentions are still above 15% in January 2024. Prior to September 2023, that had not been the case since April 2023.



Appendix

DATA COLLECTION

For this research, data was collected through Google’s job search engine utilizing an Application Programming Interface (API) provided by SerpApi. The data collected for the report includes job title, company name, description, salary (if posted), posting date, and original job board site name.

Not all online job postings appear on Google’s job search engine and as a result the data discussed in the report should be treated as a sample of job openings existing within the agriculture industry. Indeed.com, the number 1 job site in the world, does not share job posting data with Google. Google’s job search engine represents only a fraction of jobs posted online. Job postings can be posted on multiple job boards such as LinkedIn, Glassdoor, as well as company websites that allow Google’s Cloud Talent Solution to analyze their job postings and display them on Google’s job search engine.

Job postings that are available on Google’s job search engine are curated to best fit the search terms of the user. The data in this report was collected using a general search term of “agriculture”. Data presented in this report could impose bias that is specific to Google’s job search engine data. Although possible, we believe the data collected is valuable for industry employers as a metric for comparing company hiring to the agricultural industry. Therefore, this report is an analysis of Google’s data and is not fully representative of the agricultural job market.

Note that not all online job postings appear on Google’s job search engine. Job postings can be posted on multiple job boards such as LinkedIn, Glassdoor, as well as company websites that allow Google’s Cloud Talent Solution to analyze their job postings and display them on Google’s job search engine. Job postings that are available to Google’s Cloud Talent Solution are curated to best fit the search terms of the user. For this study, the search term included: “agriculture.” This allows for a broad variety of jobs to be collected that exist within the agricultural job market. The data discussed in this report represents all job postings in the United States collected from Google’s job search engine from June 2021 to November 2022. Google’s job search engine is a conglomerate of multiple online job boards. Within the data, no jobs were collected from Indeed.com. Indeed.com does not allow Google access to their job board unlike other popular job sites. Google must be granted access to a company’s job

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posting before advertising on Google’s job search engine. Many job openings appear on multiple job boards at a given time to get more advertising to potential employees.

Google’s job search engine hosts thousands of job boards’ data. Due to the immense amount of job boards available, job advertising is a competitive market. Companies seeking premium talent should post to the more popular job boards which produce more traffic.

DESCRIPTION ANALYSIS

From the data, each job posting has a description. Text mining was used to pull information from these descriptions, and it is possible to quantify the amount of mentions of specific characteristics. We were able to extract salary if not already mentioned, subsector information, requirements, and education. The categories were found using the “bag of words” technique. A list of words was created to represent any similar phrases and synonyms that represent a characteristic of interest. For example, quantitative skills would be marked as appearing in a job posting if terms appear in the description such as “quantitative”, “analysis”, “prediction”, “mathematics”, and “statistics.” These terms are represented as nouns, verbs, and adjectives to catch all forms of context that might be represented in written language. Descriptions are then searched to evaluate if any of these terms were mentioned. If a term was mentioned once or more, the description was tallied as mentioning those specific characteristics.

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Industry Subsector	Word List
Academic	Company name must contain “college”, or “university” and Description must contain “professor”, “dean”, “adjunct”, “tenure”, “chair”, “post doc”, “postdoc”, “faculty”, “lecture”, or “instructor”
Ag Education	“ag ed”, “ag teacher”, “agricultural teacher”, “ag education”, “agriculture education”, “agricultural education”, “educator”, “teach”, “teacher”, “class”, “classroom”, “ffa”, “4-h”, “4h”, “ag teacher”, “teaching”, “extension educator”, “future farmers of america”, “ext agent”, or “extension”
Agronomy	“crop adviser”, “agronomy”, “agronomist”, “corn”, “soybeans”, “soil”, “seed”, “crop”, “grain”, “cultivation”, “greenhouse”, “irrigation”, “appraiser”, “horticulture”, “fertilizer”, “pesticide”, “fungicide”, “herbicide”, “applicator”, “sprayer”, or “botanist”
Animal Science	“animal”, “veterinarian”, “veterinary”, “sheep”, “cattle”, “dairy”, “swine”, “pig”, “pork”, “beef”, “livestock”, “breed”, “poultry”, “equestrian”, “horse”, “bovine”, “ranch”, “farrowing”, “feedlot”, “grazing”, “dairies”, “milking”, “egg gatherer”, “herdsman”, or “herdsperson”
Economics	“economic”, “economist”, “econometric”, “statistician”, “risk”, “commodity”, “price”, “pricing”, “policy specialist”, “policy analyst”,
Engineering	“ag systems management”, “agricultural systems management”, “asm”, “engineer”, “mechanic”, “diesel”, “equipment”, “service tech”, “service manager”, “maintenance tech”, “production tech”, “electrical tech”, “precision tech”, “repair”, “construction”, “mechan”, “weld”, “precision”, “digital ag”, or “technology”
Farming	“farming”, “farmhand”, “planting”, “plant”, “harvest”, “harvester”, “farm”, “forage”, “combine”, or “farmer”
Food Science	“food science”, “food production”, “meat packing”, “butcher”, “food distribution”, “food handling”, “food processes”, “food product”, “meat”, or “produce”
Lending and Finance	“loan”, “credit”, “lender”, “lending”, “bank”, “finance”, “tax”, “investment”, “budget”, “financial”, “insurance”, “account”, “underwriter”, “audit”, or “collateral”
Natural Resources	“conservation”, “wildlife”, “environment”, “environmental”, “ecosystem”, “forest”, “tree”, “raw materials”, “nature”, “energy”, “pollution”, “renewable”, “fire”, “climate”, “natural”, “sustainable”, “resources”, “surveyor”, “fish”, “microbiologist”, “geologist”, “biologist”, or “biological”
Research	“research”, “laboratory”, “scientist”, “chemist”, or “lab”
Sales	“ag sales”, “agricultural sales”, “sell”, “customer”, “account”, “commission”, “sale”, “seller”, “buyer”, or “buying”

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Requirements	Word List
Communication	“communication”, “communicate”, “talk”, “call”, “email”, “explain”, “present”, “speak”
Critical Thinking	“critical thinking”, “problem solving”, “analysis”, “deliberate”, “brainstorm”, “reasoning”
Data	“data”, “data analysis”, “big data”, “data analyst”, “data wrangling”, “data collection”
Education	“degree”, “degrees”, “college”, “graduate”, “undergrad”, “doctorate”, “phd”, “bachelor”, “bachelors”, “education”, “gpa”
Experience	“work experience”, “experience”, “training”, “prior job”, “familiarity”, “practice”, “knowledge”, “background”, “exposure to”, “understanding of”
Leadership	“leadership”, “lead”, “leading”, “leader”, “manager”, “management”, “mentor”, “supervision”, “supervisor”, “supervise”
Microsoft	“excel”, “spreadsheet”, “microsoft”, “word”, “powerpoint”, “outlook”
Public Speaking	“public speaking”, “speaking”, “speech”, “speeches”, “speak”, “present”, “presentation”
Programming	“coding”, “code”, “python”, “r”, “sql”, “java”, “c”, “computing”, “algorithm”
Quantitative	“quantitative”, “analysis”, “analyze”, “analyst”, “insight”, “predict”, “prediction”, “predictive”, “math”, “mathematics”, “statistics”, “statistical”, “optimization”, “optimize”, “regression”
Remote Work	“remote”, “remote working”, “home office”, “work from home”, “work at home”
Teamwork	“collaboration”, “team”, “teams”, “teamwork”
Travel	“travel”, “drive”, “driving”, “fly”, “flying”

Desired Education	Word List
High School	“high school”
Associates	“associate’s”, “associate degree”, “associates’s degree”
Bachelors	“bachelors”, “bachelor’s degree”, “bachelor degree”
Masters	“masters”, “master’s degree”, “master degree”, “grad school”, “gradschool”, “graduate degree”, “advanced degree”
PhD	“phd”, “p.h.d”, “ph.d”, “doctorate”, “doctoral degree”

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Benefits	Word List
General Benefits	“medical”, “dental”, “vision”, “ad&d”, “ad and d”, “accidental death and dismemberment”, “std”, “short term disability”, “short-term disability”, “ltd”, “long term disability”, “long-term disability”, “vacation”, “holiday”, “disability”, “health insurance”, “health savings account”, “life insurance”, “paid time off”, “pto”, “referral program”, “retirement planning”, “retirement”
Diversity	“diverse”, “diversity”
Equal Opportunity	“equal opportunity”, “without regard”, “religion”, “sex”, “color”, “age”, “race”
Tuition Reimbursement	“tuition”
401(K)	“401k”, “401 k”, “401(k)”

States in Each Region from Figure 1 and 4	
Midwest	IN, IL, MI, OH, WI, IA, KS, MN, MO, NE, ND, SD
Northeast	CT, ME, MA, NH, RI, VT, NJ, NY, PA
South	DE, FL, GA, MD, NC, SC, VA, WV, AL, KY, MS, TN, AR, LA, OK, TX, DC
West	AZ, CO, ID, NM, MT, UT, NV, WY, AK, CA, HI, OR, WA

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