AGRICULTURAL JOB MARKET REPORT
October 2023 Report

PURDUE UNIVERSITY®

Agricultural Economics
COLLEGE OF AGRICULTURE

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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 October 2023. The Agricultural Job Market Report provides a measurement of the current state of agricultural job openings.

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 14 times between October 5, 2022, and October 4, 2023. On average, there are 2715 new job openings every four weeks. There were 2930 new job openings on Google between September 6, 2023, and October 4, 2023. Active job postings and job openings have increase for three straight months resulting in 12-month highs of 5488 and 5084 on October 4th, respectively. The number of new job openings decreased on October 4th from the 12-month high recorded on September 6th.

SALARY

The average agricultural job salary over the past 18 months is $54,682, which is below the average salary for all jobs in the United States, according to Forbes. Jobs in engineering, sales, academics, and business administration are among the highest paid in agriculture. In terms of regional salaries, remote jobs have the highest average salary, followed by the Northeast.
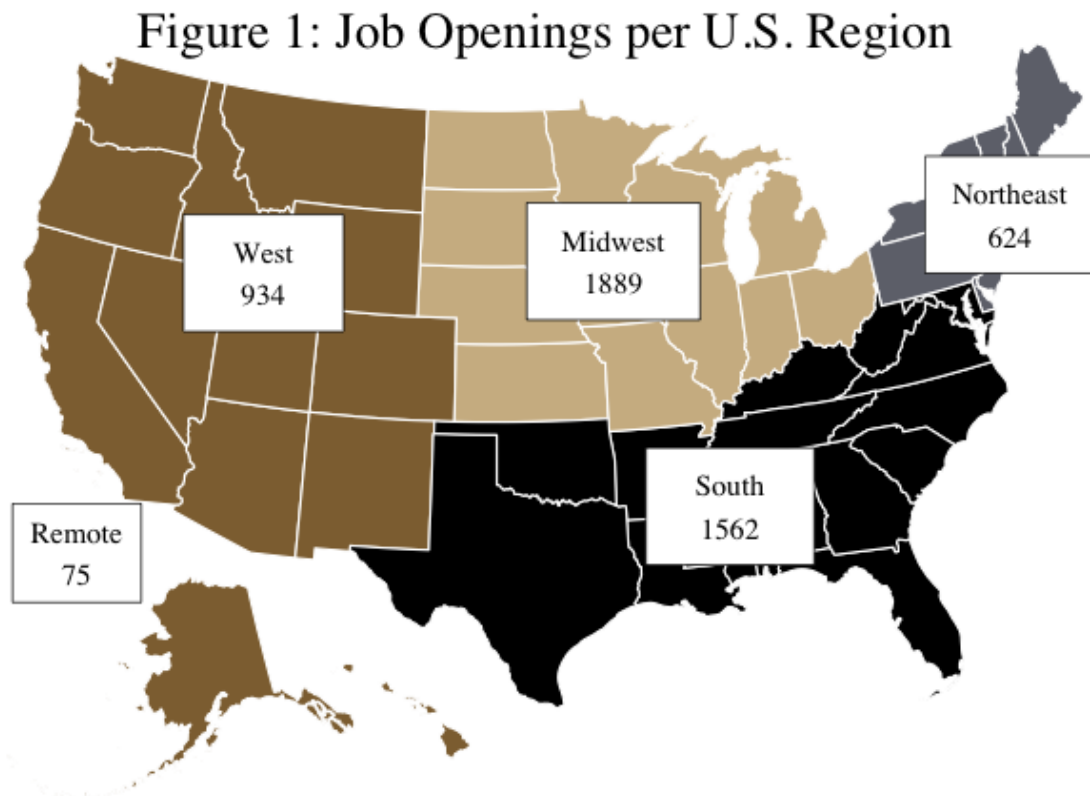
DESCRIPTION ANALYSIS

Agricultural jobs require a fair amount of experience. It is calculated that 86% of agricultural job postings mention experience in some form. Considering types of job openings, nondescript, engineering, business administration, education, and sales were the top five categories.

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 5084 total job postings on October 4, 2023. The most jobs openings were in the Midwest and South, with each region including 30% of the total job postings.
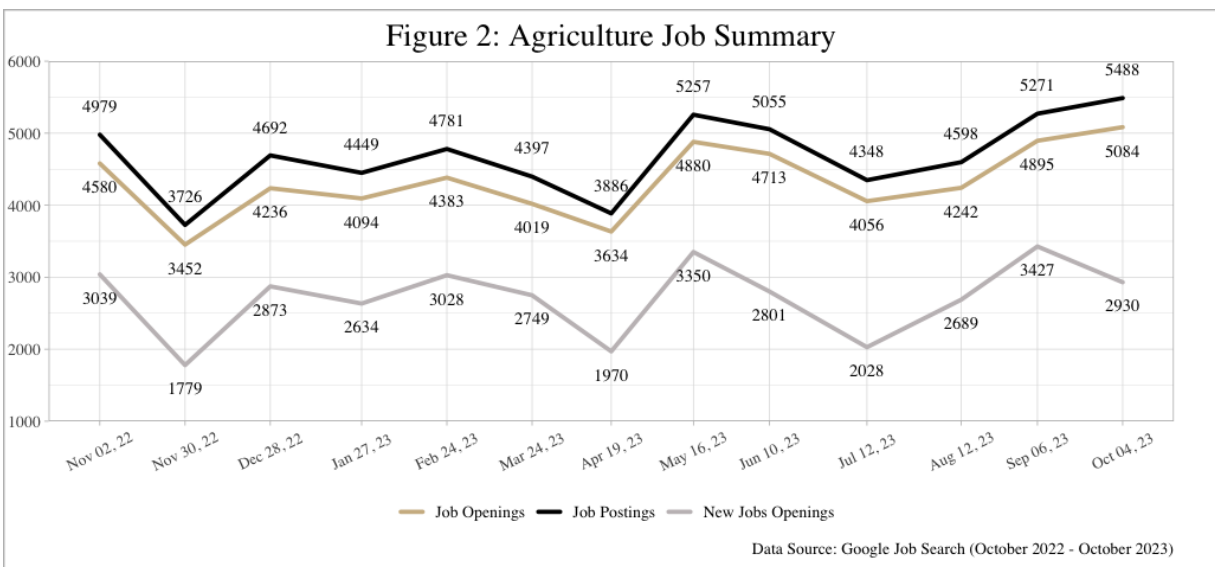

Figure 1: Job Openings per U.S. Region

West 934
Midwest 1889
Northeast 624
Remote 75
South 1562

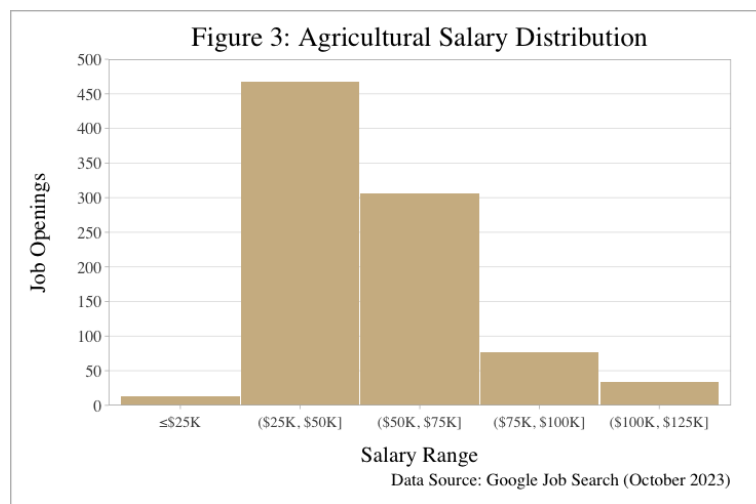Data Source: Google Job Search (October 2023)

Job Trends

Figure 2 represents one years' worth of job posting collections for each month from November 2022 to October 2023. On average, around 2715 new job openings are present every four weeks. Job postings and openings have increased for three straight months resulting in postings and openings being 26% and 25% higher on October 4th than July 12th, respectively. The 5488 postings and 5084 openings observed on October 4th both represent 12-month highs. On average, there are 1.08 job postings per job opening. Each unique job observed in a collection that was not present in the previous collection is considered a new job. October 4th saw the number of new openings decrease for the first time since July.

Figure 2: Agriculture Job Summary

Salary

The national median salary computed for the October 2023 data was $47,250/year, and the average salary was $54,682/year. It is important to note that only 16% of job openings included salary information. Figure 3 illustrates the distribution of salary among agricultural job openings. According to ZipRecruiter, the national average salary for agricultural related jobs is $49,075/year. The average salary for all occupations is $59,482/year, according to Forbes.

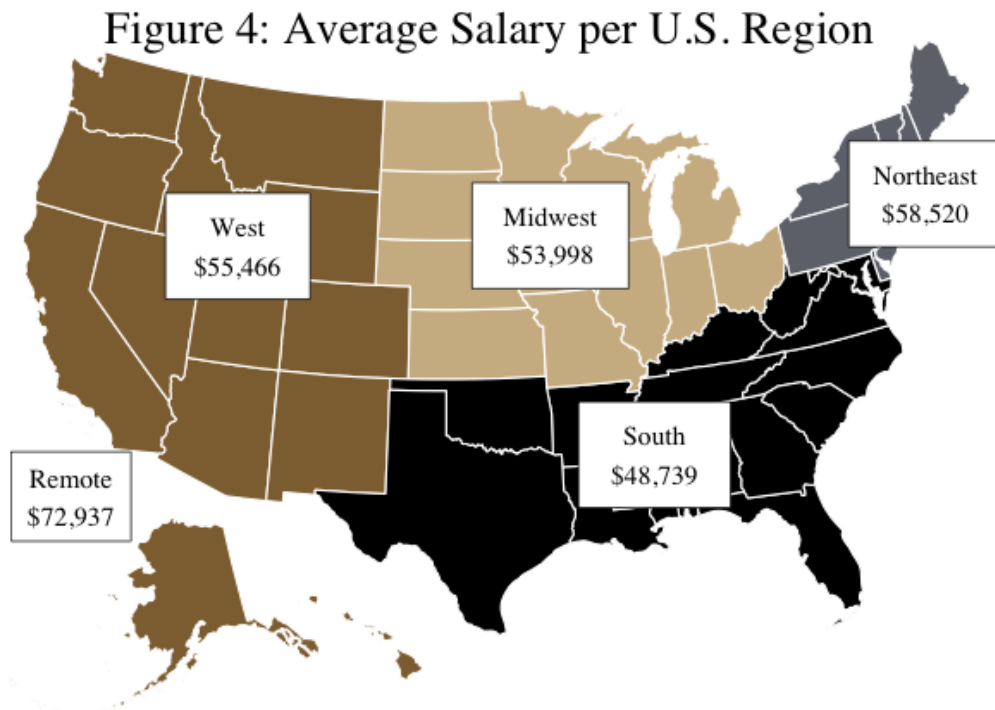Figure 3: Agricultural Salary Distribution

SALARY BY CATEGORY

The distribution of salaries varies across the different subsectors of agricultural jobs, as shown in Table 1. Jobs in sales ($68,416/year), academics ($66,632/year), and engineering ($65,212/year), have the highest average salary. Non-specialized work had the lowest average income with an annually salary of $42,650.

Table 1 Job Category by Title	Average Salary	Median Salary
Academic	$66,632	$64,427
Agronomy	$60,260	$58,199
Animal Science	$52,343	$45,000
Business Administration	$61,086	$62,982
Economics	$48,712	$49,380
Education	$52,501	$53,295
Engineering	$65,212	$60,473
Farming	$49,759	$52,500
Food Science	$47,142	$44,000
Lending and Finance	$47,942	$37,696
Natural Resources	$46,705	$46,160
Nondescript Titles	$43,303	$33,925
Research	$52,876	$49,200
Sales	$68,416	$62,600
Non-Specialized Work	$42,650	$41,600
Google Job Search (October 2023)		

SALARY BY REGION

Average salaries vary by region. Figure 4 illustrates the vartiation in average salaries across the U.S. Fully remote jobs have the highest listed salary at $72,937/year. The Northeast has the 2nd highest average salary listed in job postings at $58,520/year, followed by the West at $55,466/year. The fourth highest average salary by region is the Midwest at $48739/year, followed by the South at $48,562/year.
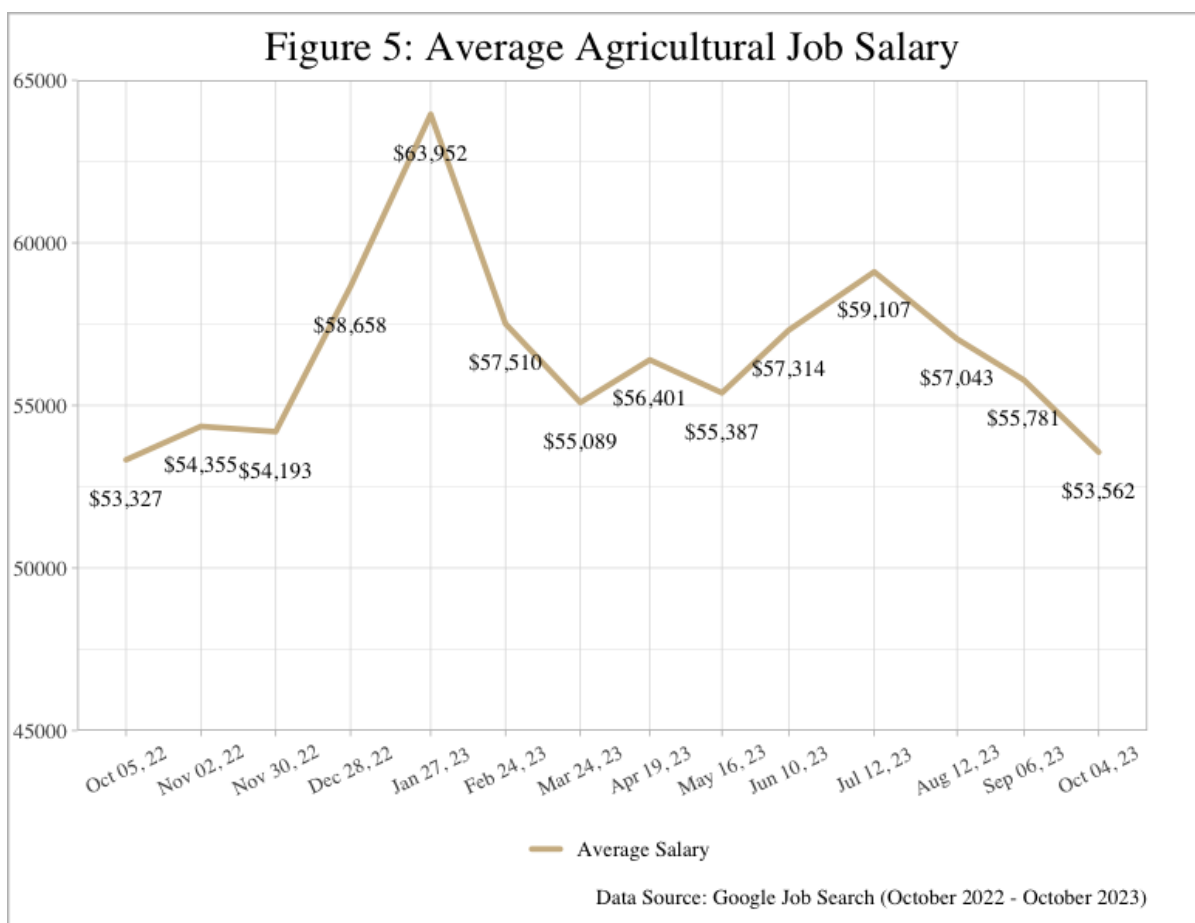

Figure 4: Average Salary per U.S. Region

West
$55,466

Midwest
$53,998

Northeast
$58,520

Remote
$72,937

South
$48,739

Data Source: Google Job Search (October 2023)

SALARY TRENDS

The average salary for observed agricultural jobs over the last 12 months are depicted in Figure 5. The 12-month high was just below $64,000/year in January 2023. More recently, average salaries peaked in July 2023 at $59,107/year. Since then, there have been three straight months of decline leading to an average salary of $53,562/year across the jobs observed on October 4th.

Figure 5: Average Agricultural Job Salary

Data Source: Google Job Search (October 2022 - October 2023)

Description Analysis

KEYWORDS

The data can be grouped by mentions within job descriptions. Table 2 reports the percent of job openings that include each word or some variation of it. The top four terms are farming, natural resources, agronomy, sales, which are all mentioned by over half of the jobs.

Table 2 Keywords	Job Openings that Mention
Academic	6.50%
Economics	24.60%
Ag Education	6.80%
Engineering	19.40%
Sales	51.20%
Agronomy	52.40%
Animal Science	20.50%
Farming	66.40%
Food Science	17.00%
Natural Resources	52.80%
Google Job Search (October 2023)	

REQUIRED SKILLS

Table 3 shows the average percentage of mentions for specific job requirements. Experience is required by 86% of jobs, while over 50 percent of jobs also require leadership, communication, education, and travel. The required skills and experiences are found across multiple different subsectors of agricultural jobs.

Table 3 Requirements	Job Openings that Mention
Communication	69.60%
Critical Thinking	14.80%
Data	28.30%
Education	61.90%
Experience	86.00%
Leadership	73.30%
Microsoft	37.20%
Public Speaking	34.00%
Programming	10.60%
Quantitative	29.90%
Remote Work	17.60%
Teamwork	46.70%
Travel	61.70%
Google Job Search (October 2023)	

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. Generally, a low share of agricultural jobs indicate a required education. According to Table 4, a high school degree, the most cited degree requirement, is mentioned in 21% of agricultural job postings.

Table 4 Desired Education	Job Openings that Mention
High School	21.20%
Associates	2.00%
Bachelors	16.60%
Masters	8.20%
PhD	4.50%
Google Job Search (October 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

Table 5 Benefits	Job Openings that Mention
Benefits	66.70%
Diversity	24.60
Equal Opportunity	85.10
Tuition Reimbursement	5.50%
401(K)	8.60%
Google Job Search (October 2023)	

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 the general term "benefits" in the description, but few references specific benefits such as 401(K) and tuition reimbursement. Additionally, 85% of jobs included mention of equal opportunity.
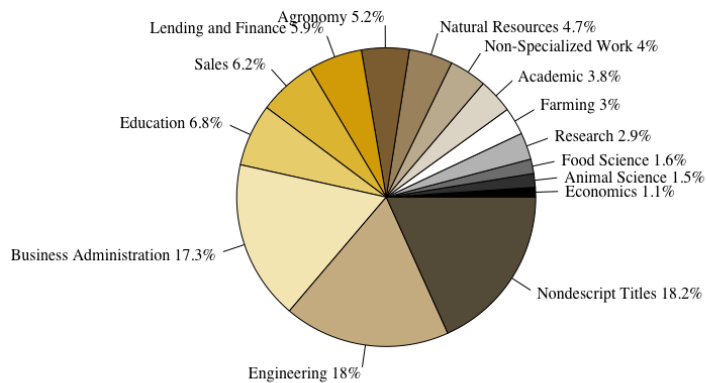
JOB CATEGORIES

Jobs can be classified based upon terms written in job posting titles. The pie chart in Figure 6 shows the breakdown of agricultural job categories from April 2022 to October 2023. The most common job types are engineering (18%), business administration (17%), education (7%), and sales (6%). Job titles that could not be classified make up 18% of agricultural job postings.
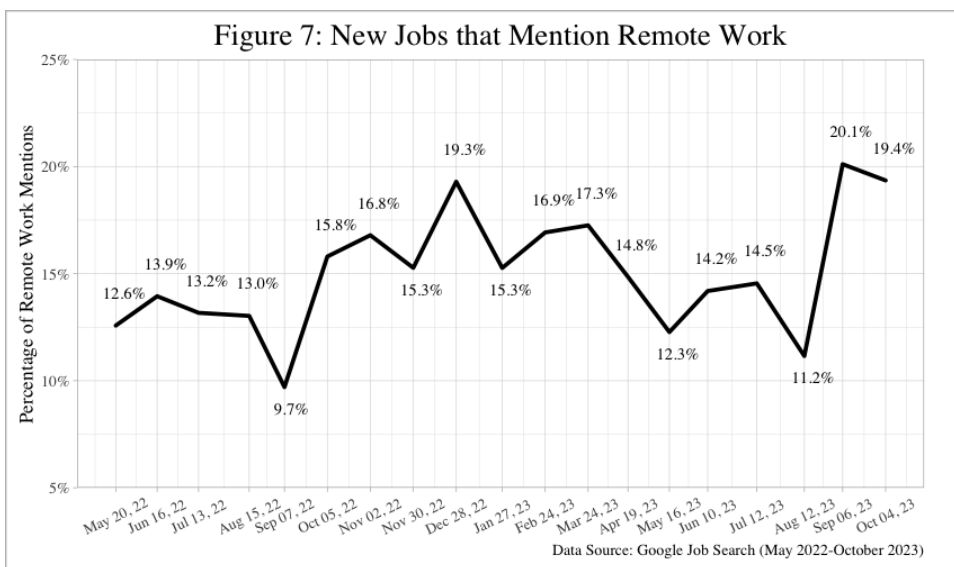
Figure 6: Job Categories by Keywords in Title

Data Source: Google Job Search (April 2022-October 2023)

REMOTE WORK

At the beginning of 2020, the Covid-19 pandemic disrupted in-person and office-based 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 7 depicts the percent of new jobs in each collection that mention remote work. Mentions of remote fluctuate from collection to collection, but there has been a significant increase in the last two months with 20.1% of jobs and 19.4% of jobs in September 2023 and October 2023 mentioning remote work, respectively. Percent of new jobs mentioning remote work had been below 15% for the previous five months.

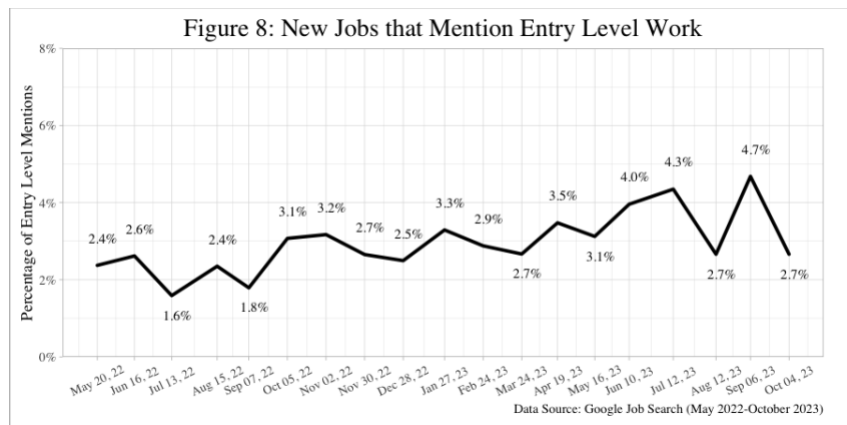Figure 7: New Jobs that Mention Remote Work

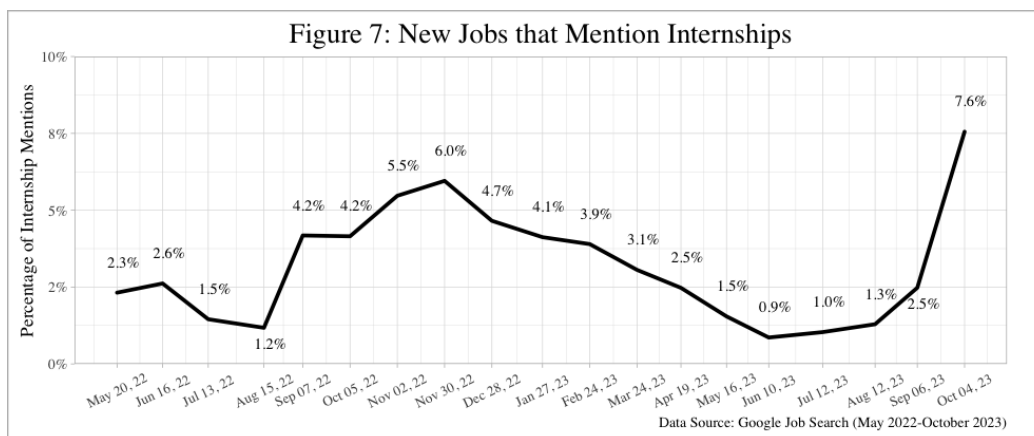Data Source: Google Job Search (May 2022-October 2023)

NEW ENTRY LEVEL OPENINGS

The percent of new jobs that mention entry level work since May 2022 is shown in Figure 8. Between May 2022 and October 2023, between 1.6% and 4.7% of new openings have mentioned entry level work. It is hard to recognize any trend as there are never more than two consecutive months of increased or decreased mentions.

Figure 8: New Jobs that Mention Entry Level Work
Data Source: Google Job Search (May 2022-October 2023)

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 9 shows the percent of new jobs that mention internship between May 2022 and October 2023. Internship mentions are cyclical, increasing in the fall as companies seek students to employ and slowly decrease as the summer positions are filled. Most recently, internship mentions have increased from 1.3% to 7.6% from August to November 2023 as internship positions for the year have been posted.

Figure 7: New Jobs that Mention Internships
Data Source: Google Job Search (May 2022-October 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

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.

AGRICULTURE JOB MARKET REPORT

Keywords (Related to Table 2)	Word List
Academic	Company name must contain "college", "university" and Description must contain "professor", "dean", "university", "academic"
Economics	"ag economics", "agriculture economics", "economic", "ag business", "agricultural business", "agri-business", "econometric", "market", "market research", "market analysis", "loan", "credit", "lending"
Ag Education	"ag education", "agricultural education", "ag ed", "extension educator","ffa", "future farmers of america", "4-h","ag teacher", "agricultural teacher"
Engineering	"ag engineering", "agricultural engineering", "ag systems management", "agricultural systems management", "asm", "mechanic", "diesel mechanic"
Sales	"ag sales", "agricultural sales", "sales", "sell", "customer", "account", "seller", "buyer", "selling", "buying", "commission"
Agronomy	"agronomy", "agronomist", "corn", "soybeans", "soil", "seed", "crop", "crop adviser", "row crop"
Animal Science	"animal science", "animal", "veterinarian", "sheep", "cattle", "dairy", "swine", "pig", "pork", "beef", "livestock", "breed", "poultry", "equestrian", "horse"
Farming	"farming", "farmhand", "planting", "plant", "harvest", "harvester", "farm", "forage", "combine", "farmer"
Food Science	"food science", "food production", "meat packing", "butcher", "food distribution", "food handling", "food processes", "food product", "meat", "produce"
Natural Resources	"natural resources", "conservation", "wildlife", "environment", "environmental", "ecosystem", "forest", "raw materials", "nature", "energy", "pollution", "renewable"

Requirements (Related to Table 3)	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 (Related to Table 4)	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"

Other Requirements (Related to Table 5)	Word List
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)"

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Category (Related to Figure 6 and Table 1)	Word List
Academic	"professor", "dean", "academic", "college", "adjunct", "tenure", "chair", "post doc", "postdoc", "faculty"
Agronomy	"agronomy", "agronomist", "corn", "soybeans", "soil", "seed", "crop", "grain", "cultivation", "greenhouse", "irrigation", "appraiser", "horticulture", "fertilizer", "pesticide", "fungicide", "herbicide", "applicator", "sprayer", "botanist"
Animal Science	"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", "herdsperson"
Business Administration	"business", "market", "administration", "manager", "management", "admin", "program tech", "supervis", "retail", "coordinator", "operation", "purchas", "bookkeeper", "human resource", "customer service", "receptionist", "executive assistant", "product specialist", "recruit", "executive director", "inventory specialist", "it specialist", "legal", "attorney", "law", "corporate", "commercial", "secretary", "consultant", "trader"
Economics	"economic", "economist", "econometric", "statistician", "risk", "economy", "commodity", "price", "pricing", "policy specialist", "policy analyst", "policy"
Education	"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", "extension"
Engineering	"engineering", "engineer", "mechanic", "diesel", "equipment", "service tech", "service manager", "maintenance tech", "production tech", "electrical tech", "precision tech", "repair", "construction", "mechan", "weld", "precision", "digital ag", "technology"
Farming	"farming", "farmhand", "planting", "plant", "harvest", "harvester", "farm", "forage", "combine", "farmer"
Food Science	"food science", "food production", "meat packing", "butcher", "food distribution", "food handling", "food processes", "food product", "meat", "produce", "food", "nutrition", "sugar"

Lending and Finance	"loan", "credit", "lender", "lending", "bank", "finance", "accountant", "accounting", "tax", "budget", "financial", "investment", "insurance", "account", "underwriter", "audit", "collateral"
Natural Resources	"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", "biological"
Nondescript Titles	All jobs that do not match any of the other categories. Top 2 titles shown include: "Agriculture Technician" and "Agricultural Program Specialist"
Research	"research", "laboratory", "science", "scientist", "chemistry", "chemist", "lab", "chemical"
Sales	"sale", "seller", "buyer", "selling", "buying"
Non-Specialized Work	"operator", "manufacture", "package", "production", "transport", "driving", "driver", "cdl", "labor", "seasonal", "worker", "forklift", "process", "inspector", "investigator", "pest control", "security", "yard person", "quality assurance", "clean", "mow", "lawn", "assembler", "helper", "warehouse", "landscape", "landscaping", "yard"

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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