Florida Stakeholder Engagement Program (STEP)

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ANNUAL REPORT
2025

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Florida Stakeholder Engagement Program (STEP)

https://step.ifas.ufl.edu/
Agricultural and Biological Engineering Department
North Florida Research and Education Center-Suwannee Valley (NFREC-SV)
Institute of Food and Agricultural Sciences
University of Florida.

Mission Statement:

The University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS) is dedicated to developing knowledge in agriculture, human and natural resources, and the life sciences. To that end, the Florida Stakeholder Engagement Program (STEP) engages farmers and other agricultural stakeholders in friendly crop management competitions focused on input-use efficiency and profitability. The program creates a shared learning experience for growers, industry representatives, policymakers, researchers, and extension agents. The goal is to improve crop management and increase the adoption of Agricultural best Management Practices (BMPs) to sustain agriculture and protect water quality.

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Leadership TEAM

Vivek Sharma
Assistant Professor
Agricultural and Biological Engineering (ABE) Department
University of Florida
vsharma1@ufl.edu

Kevin Athearn
Regional Specialized Agent
Rural and Agribusiness Development
UF/IFAS - NFREC-SV
athearn@ufl.edu

Michael Dukes
Associate Dean, UF/IFAS Extension
Director, UF/IFAS Center for Land Use Efficiency
mddukes@ufl.edu

Bob Hochmuth
Assistant Center Director and Regional Specialized Agent – Vegetables,
UF/IFAS – NFREC-SV
bobhoch@ufl.edu

Jonathan Adam Watson
Assistant Professor
Agricultural and Biological Engineering Department
jaw7385@ufl.edu

Carson Jones
UF/IFAS – NFREC-SV
jonescarson@ufl.edu

Kelly Aue
Suwannee River Partnership Outreach Coordinator
UF/IFAS – NFREC-SV
kaue@ufl.edu

Anthony Crain
Farm Manager
UF/IFAS – NFREC-SV
ben7600@ufl.edu

Joel Love
Education/Training Specialist II – BMP, UF/IFAS – NFREC-SV
jclove@ufl.edu

Shiva Bhambota
Post Doctoral Research Associate
ABE-UF
sbhambota@ufl.edu

Amanda Philips
UF/IFAS – NFREC-SV
amanda.phillips@ufl.edu

Executive Summary

The Florida Stakeholder Engagement Program (STEP) continued in 2025 with the objective of improving irrigation and nitrogen use efficiency while maintaining profitability under North Florida row-crop production systems. Building on outcomes and stakeholder feedback from the 2022–2024 STEP competitions, the 2025 program emphasized refined irrigation scheduling, optimized nitrogen management strategies, and continued peer-to-peer engagement among growers, industry representatives, and extension personnel.

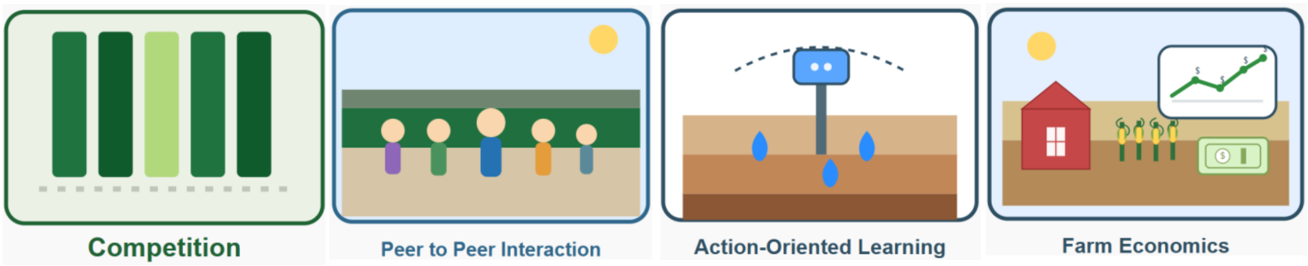
The 2025 STEP competition was conducted at the UF/IFAS North Florida Research and Education Center–Suwannee Valley (NFREC-SV). A total of 19 teams participated, each managing replicated plots under a common production framework while making independent decisions related to hybrid selection, seeding rate, nitrogen management, irrigation scheduling, insurance selection, and grain marketing. Seasonal grain yield ranged from 72 to 254 bu/ac, total irrigation applied ranged from 1 to 18.2 inches, and total nitrogen application ranged from 168 to 381 lb N/ac.

Results from the 2025 competition demonstrated that competitive yields and strong economic performance can be achieved without maximizing input-use. Teams that balanced irrigation and nitrogen inputs generally achieved higher input-use efficiency and comparable profitability relative to higher-input strategies. These findings reinforce the value of best management practices (BMPs) for water and nutrient stewardship and directly support FDACS goals related to water-quality protection and water-conservation planning.

Program Overview

The Florida Stakeholder Engagement Program (STEP) is a UF/IFAS Extension and applied research initiative designed to evaluate real-world agronomic, irrigation, nutrient, and economic decision making within a structured, competitive framework by engaging growers, industry partners, and agency partners through interactive, farm-management competitions. STEP provides a real-world, risk-free environment in which participants evaluate production, economic, and risk-management decisions using field-generated data. The STEP program was initiated in 2022 in response to increasing challenges faced by Florida row crop producers, including the adoption of best management practices, rising input costs, increasing climate variability, heightened concerns regarding water availability, and the need to meet state and federal water quality objectives. Traditional extension approaches often isolate individual management practices; however, commercial producers must take integrated decisions that simultaneously affect productivity, profitability, and environmental outcome. STEP was designed especially to address these gaps by evaluating whole system management strategies rather than single inputs in isolation.

A defining feature of STEP is its competition-based learning structure. Participants manage a simulated farm operation and make independent decisions related to crop management, nutrient application, irrigation scheduling, insurance coverage and grain marketing. These decisions are implemented under uniform field conditions, allowing outcomes to be compared objectively across teams. The competitive framework enhances engagement while preserving the educational intent of the program by emphasizing learning outcomes over winning alone. The program operates on the four core pillars:



Competition components motivate participants to actively engage with the data and consider tradeoffs among yield, efficiency, and economic performance. Peer-to-peer interaction facilitates discussion among growers, industry representatives, and extension personnel, enabling participants to learn from diverse perspectives and management philosophies. Action-oriented learning ensures that decisions are informed by real data, including weather conditions, soil moisture status, and crop performance metrics. Also, to understand ways to make our farms profitable.

STEP competitions are conducted using replicated field plots managed by the UF/IFAS project team to ensure consistency and experimental integrity. Participants do not physically manage the plots but instead make strategic decisions that are implemented uniformly across the field. This approach allows participants to focus on decision-making processes rather than operational logistics, while also ensuring that differences in outcomes are attributable to management decisions rather than execution variability.

Since its inception, STEP has expanded in scope and complexity, incorporating lessons learned from previous seasons to improve experimental design and educational value. Early competitions highlighted the influence of multiple interacting factors—such as seeding rate, hybrid selection, nitrogen rate, and irrigation scheduling on yield and profitability. As a result, later iterations of the program, including the 2025 competition, were refined to reduce confounding variables and strengthen interpretation of management effects. The 2025 STEP competition represents a continuation and refinement of this multi-year effort. Based on findings from 2022–2024, the 2025 design emphasized greater control of structural variables to isolate the effects of nitrogen and irrigation management. Teams managed planting at a uniform seeding rate of 32,000 seeds per acre, holding this improved the ability to attribute observed differences in yield, efficiency, and economic outcomes directly to management decisions rather than inherent structural advantages.

2025 Competition Design and Management Decisions

Experimental Site and Design:

The 2025 STEP competition was conducted under a sprinkler-irrigated system at the UF/IFAS NFREC-SV. Collectively, a total of nineteen teams from different counties of Florida region participated in collaboration with consultants and state agency personnel to test, observe, experiment, and implement new and emerging water and fertilizer BMPs and technologies(Figure 1).The study was arranged as a randomized complete block design with four replicated plots for each participating team, allowing for statistical comparison of management outcomes (Figure2). All physical field operations, including planting, fertilization, irrigation application, pest management, and harvesting, were conducted uniformly by the STEP project team. Participants managed a simulated 1,000-acre farm, with economic outcomes scaled accordingly based on measured plot yields and management decisions.

Team Name	
Bishop Farms	Rocking D Squared
Corn Convicts	Rootin Tutens
Cornadoes	SEAL
Deas Farms	Silo Squad
Florikan	Soil Sisters
Gilchrist Girls	Team Columbia
Jackson Farms	Team Quincy
PS Farms	The Corn Flakes
Pursell	Wilkerson Farms
Riverbend Farms	

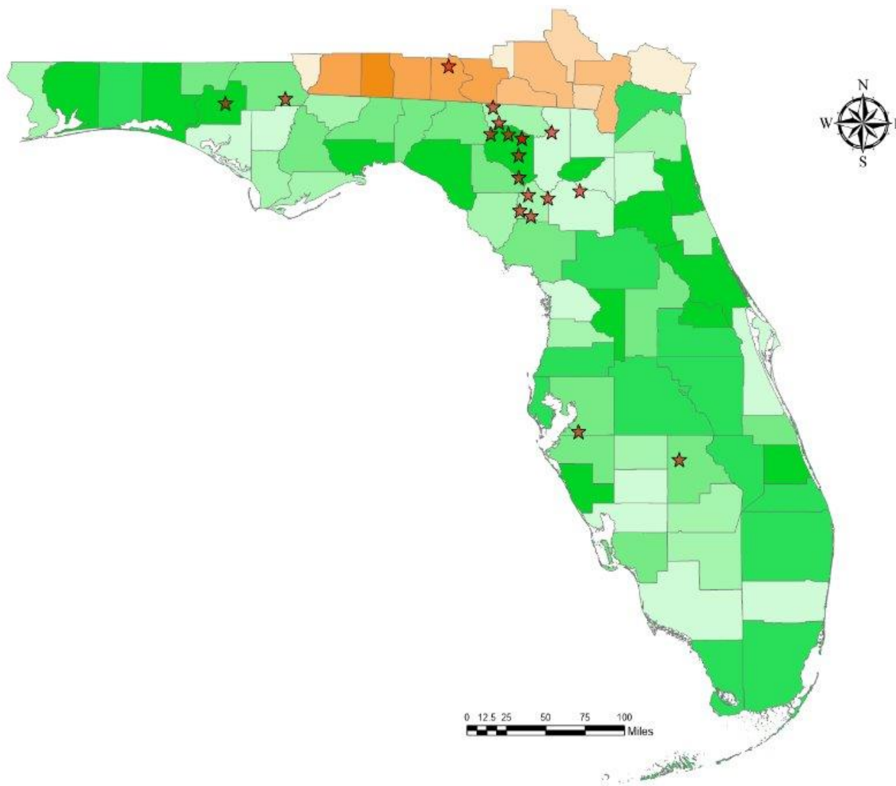


Figure 1. Team names and the location of the 2025 STEP competition participants.

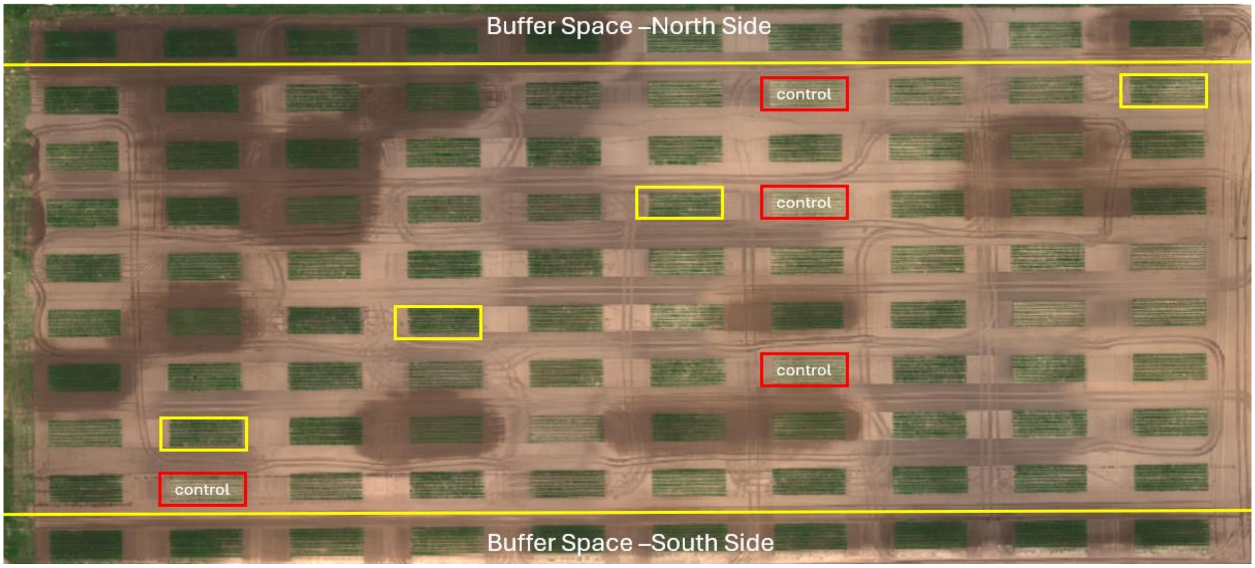


Figure 2. Aerial Imagery of 2025 Florida Stakeholder Engagement Program (STEP) competition held at the North Florida Research and Education Center-Suwannee Valley (NFREC-SV).

Hybrid Selection and Seeding Rate:

Participating teams selected corn hybrids prior to planting. Hybrid selection in 2025 was highly concentrated, with the teams given the option to either choose the default hybrid Pioneer 2042VYHR which is the most stable and widely chosen variety based on previous years or to bring their own hybrid. All teams planted corn at a uniform seeding rate of 32,000 seeds per acre. This design choice was implemented to eliminate plant population as a source of yield variability and to improve interpretation of nitrogen and irrigation responses. The fixed seeding rate reflects common commercial practice for irrigated corn production in North Florida and aligns with UF/IFAS recommendations for high-yield environments.

Nitrogen Management:

All plots received a uniform starter fertilizer at planting of 13 gallons per acre (30 lbs of N/ac). The starter fertilizer was applied using a double-coulter liquid fertilizer applicator, placed at a depth of approximately 2 inches and 2 inches lateral to the planted row to ensure early-season nitrogen availability and promote uniform crop establishment. This starter application was standardized across all plots and teams to eliminate variability during early crop growth. Following planting, participating teams selected between two nitrogen management strategies: in-season conventional fertilizer programs or controlled-release fertilizer (CRF) applied at planting. Of the total 19 participating teams in 2025, seven teams elected to use CRF, while the remaining teams implemented conventional in-season nitrogen programs. This design allowed direct comparison of nitrogen delivery strategies under uniform crops, seeding rate, and environmental conditions. Teams selecting the conventional fertilizer program were provided full flexibility in selecting total nitrogen rate, timing, fertilizer material, and application method throughout the growing season. Available nitrogen sources included dry ammonium nitrate (34-0-0-7) applied either as broadcast or banded applications, and UAN 28% (28-0-0-5) applied as liquid side-dressing. Teams were permitted to vary application methods across different application timings, allowing adaptive nitrogen management in response to crop development and weather conditions.

Banded nitrogen applications were implemented using the 1st Products application rig, ensuring accurate placement of fertilizer near the crop root zone. Liquid side-dressing applications were applied at the soil surface adjacent to each row using a high-clearance applicator equipped with Y-drop assemblies (Figure 4), allowing uniform distribution of UAN fertilizer along the planted rows during in-season growth stages.

Teams selecting the CRF program applied nitrogen entirely at planting using polymer-coated urea fertilizers. Available CRF products included 43-0-0 from Harrell's, 44.5-0-0 Pursell, and 43.75-0-0 from Florikan, with application rates ranging from 150 to 300 lb N/ac. All CRF applications were incorporated at planting to provide season-long nitrogen release aligned with crop demand. Similar to conventional programs, CRF teams were also provided with the option to apply an additional 30 lb N/ac in the event of a leaching rainfall.

Nitrogen management decisions reflected a range of approaches, from lower-input strategies emphasizing efficiency to higher-input strategies targeting maximum yield potential. Soil and plant tissue data collected during the season were provided to teams to support in-season decision making.

Irrigation Management:

Irrigation during the 2025 STEP competition was applied using a two-span Valley lateral move Variable Rate Irrigation (VRI) system equipped with zone control technology (Valmont Industries, Inc.). This system enabled precise spatial control of irrigation application across experimental plots while ensuring uniform system operation throughout the field. The irrigation system was operated daily throughout the growing season, allowing irrigation events to be scheduled in response to crop water demand and prevailing environmental conditions. Participating teams submitted their irrigation decisions one day prior to each irrigation event through the STEP web-based decision platform. To maintain consistency and prevent excessive water application, the maximum irrigation depth per event was limited to 0.5 inches. If a team failed to submit an irrigation decision by the specified deadline, no irrigation was applied to that team's plot for that irrigation cycle. Teams were provided with three irrigation scheduling approaches from which to select:(i) soil moisture–based irrigation scheduling, (ii) evapotranspiration (ET)–based irrigation scheduling, and(iii) pre-determined calendar-based irrigation scheduling. This framework allowed evaluation of diverse irrigation decision-making strategies under uniform system and environmental conditions. For teams selecting soil moisture–based irrigation scheduling, one set of soil moisture sensors was installed per team to support real-time monitoring of soil water status. Teams were given the option to choose among three commercially available sensor platforms: (i) Sentek Drill & Drop probes (BMP Logic), and(iii) AquaSpy probes. Based on the selected sensor platform, teams were provided complimentary access to real-time soil moisture data through the respective online platforms for use in irrigation decision-making. Teams utilizing evapotranspiration-based scheduling were provided free access to smart irrigation applications that integrate weather data and crop water use estimates. These tools enabled teams to estimate crop evapotranspiration and adjust irrigation accordingly. Teams selecting calendar-based scheduling followed pre-determined irrigation intervals and depths independent of sensor or ET data. This irrigation management framework allowed participating teams to employ a range of irrigation strategies while maintaining consistent system constraints. The resulting variability in irrigation timing and total seasonal irrigation depth provided a robust dataset for evaluating irrigation performance, water-use efficiency, and interactions with nitrogen management under irrigated corn production systems in North Florida.

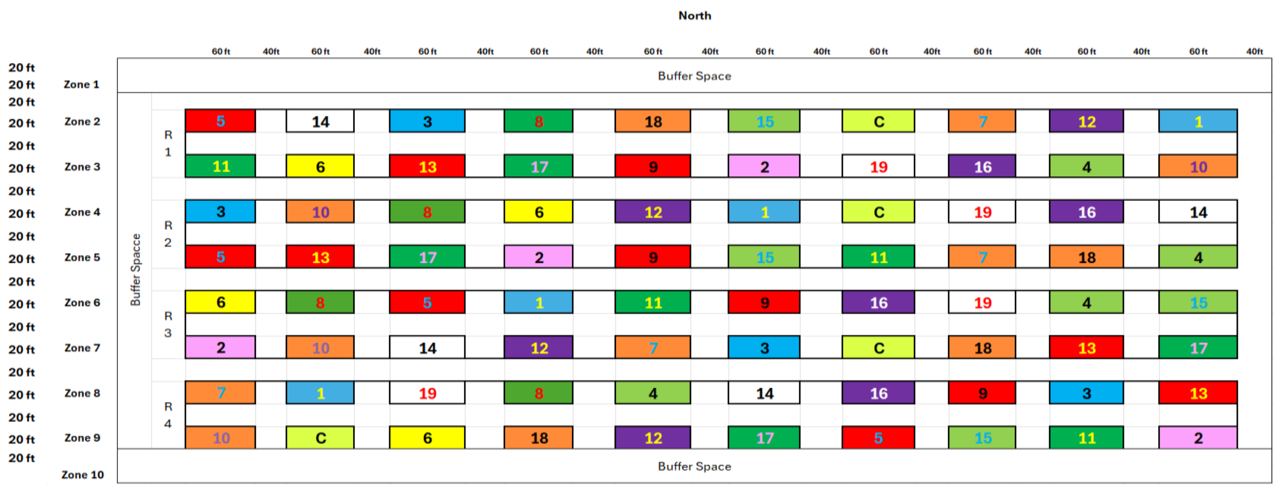


Figure 3. Plot map for the 2025 STEP competition held at the North Florida Research and Education Center-Suwannee Valley (NFREC-SV).

Figure 4. Millers High Boy 360 y-drop used fir liquid side dressing.

Insurance Selection:

As part of the 2025 STEP competition, participating teams selected a multi-peril crop insurance (MPCI) plan to evaluate risk-management decisions under simulated commercial production conditions. Teams were provided with two insurance options: Yield Protection (YP) and Revenue Protection (RP).

Yield Protection (YP) insurance provides coverage against yield losses only, while Revenue Protection (RP) insurance protects against losses in both yield and price, thereby offering broader risk coverage. Under both plans, losses caused by insured perils, including adverse weather events, failure of irrigation water supply (when caused by an insured peril), fire, insects, plant disease (excluding damage resulting from insufficient or improper control measures), and wildlife were eligible for coverage.

Insurance premiums for both YP and RP plans were based on 2025 USDA Risk Management Agency (USDA-RMA) premium rates and were provided to all teams prior to the start of the competition. Premium estimates were standardized for a simulated 1,000-acre corn operation with an Actual Production History (APH) yield of 205 bu/ac, ensuring consistency in economic comparisons across teams. The projected corn price used in premium calculations was $4.66 per bushel, as established by USDA-RMA.

Teams were allowed to select coverage levels ranging from 50% to 85%, offered in 5% increments, enabling participants to align insurance decisions with their individual risk tolerance and management philosophy. As expected, Revenue Protection premiums were consistently higher than Yield Protection premiums at equivalent coverage levels due to the inclusion of price risk coverage (Table 1).

Table 1. Premium rates for crop insurance provided to teams prior to the competition.

Coverage Level	Yield Protection (YP) Premium ($/ac)	Revenue Protection (RP) Premium ($/ac)
50%	2.28	3.09
55%	3.18	4.52
60%	4.13	6.22
65%	6.15	9.68
70%	8.02	12.98
75%	11.69	18.82
80%	18.07	28.56
85%	28.46	43.97

The inclusion of multiple insurance products and coverage levels allowed the 2025 STEP competition to assess how differing risk-management strategies influenced overall economic performance when integrated with agronomic, irrigation, and marketing decisions. Two teams received insurance indemnity payments, providing valuable insight into tradeoffs between premium expenditure and risk protection.

Grain Marketing and Price Risk Management:

Each participating team in the 2025 STEP competition was responsible for marketing corn produced from a simulated 1,000-acre farm operation. This upscaling approach was used to provide participants with an opportunity to make grain marketing decisions at a scale consistent with commercial corn production, thereby reinforcing the economic realism of the competition. Total marketable grain volume for each team was calculated by multiplying the average harvested grain yield per acre from their research plots, standardized to 15.5% grain moisture, by 1,000 acres. All simulated grain was assumed to be delivered to a local buying point during the week of harvest at 15.5% moisture. To isolate marketing decisions from post-harvest logistics, no on-farm storage, grain drying, or long-distance transportation options were permitted. Teams were allowed to market grain using either flat-price forward contracts or basis forward contracts, executed in 10,000-bushel increments, for August delivery. Contracting was permitted at any time between the start of the competition and the date of research plot harvest. Forward contract prices were determined using the daily closing price of the Chicago Board of Trade (CBOT) September corn futures contract, adjusted by a local basis value posted weekly on the STEP website (https://step.ifas.ufl.edu/). The local basis used for the competition was calculated as the average of price quotes obtained from three local grain buying points,representing actual local market conditions. This standardized basis ensured consistency and transparency in contract pricing across all participating teams. A comparison of the trends in the contract pricing of corn is shown in Figure 5.

Any grain not sold through forward contracts, calculated as the total harvested bushels from the simulated 1,000-acre operation minus the number of bushels contracted, was assumed to be sold at the average spot market price during the week of harvest. This approach allowed teams to evaluate the tradeoffs between price certainty through contracting and potential gains or losses associated with spot market exposure. In cases where a team contracted more bushels than were harvested, the team incurred a penalty to reflect real-world over-contracting risk. Specifically, the team was charged the difference between the spot market price and the highest contract price (when the spot market price exceeded the contract price), in addition to a $0.20 per bushel handling fee, applied to the number of bushels that were over-contracted.

This grain marketing framework enabled evaluation of price risk management strategies under realistic market conditions while maintaining consistent assumptions across teams. The resulting differences in average prices received and total revenue contributed to variation in overall economic performance and highlighted the importance of integrating marketing decisions with agronomic and risk management strategies**.** Marketing strategies varied widely and contributed to differences in average delivered price among teams (Figure 6).

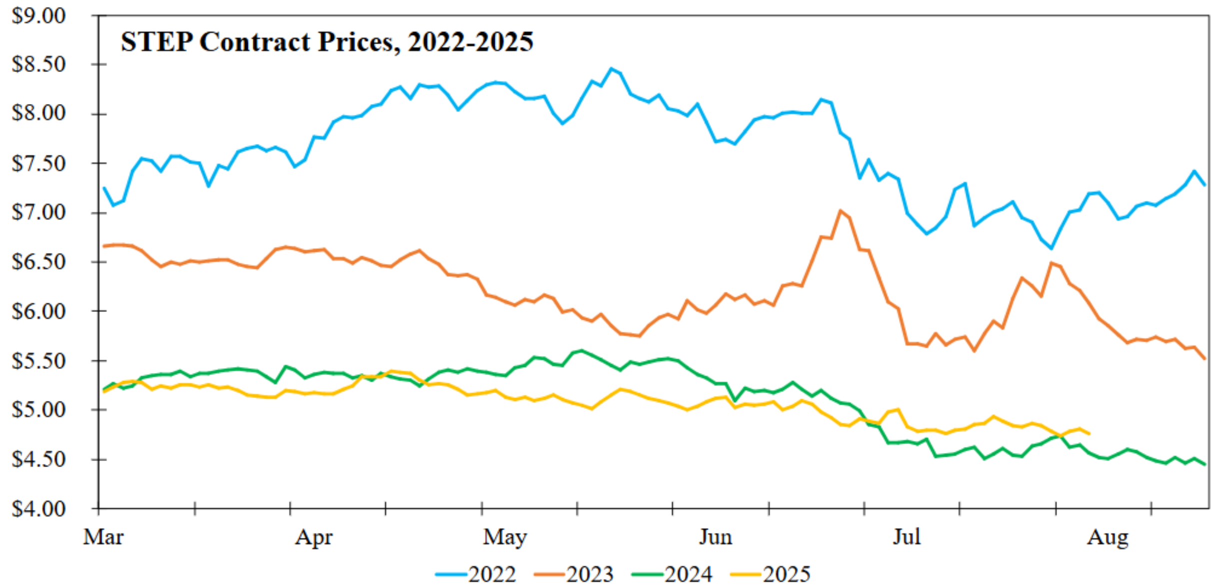


Figure 5. Contract Prices($/bu)-August Delivery of four years compared.

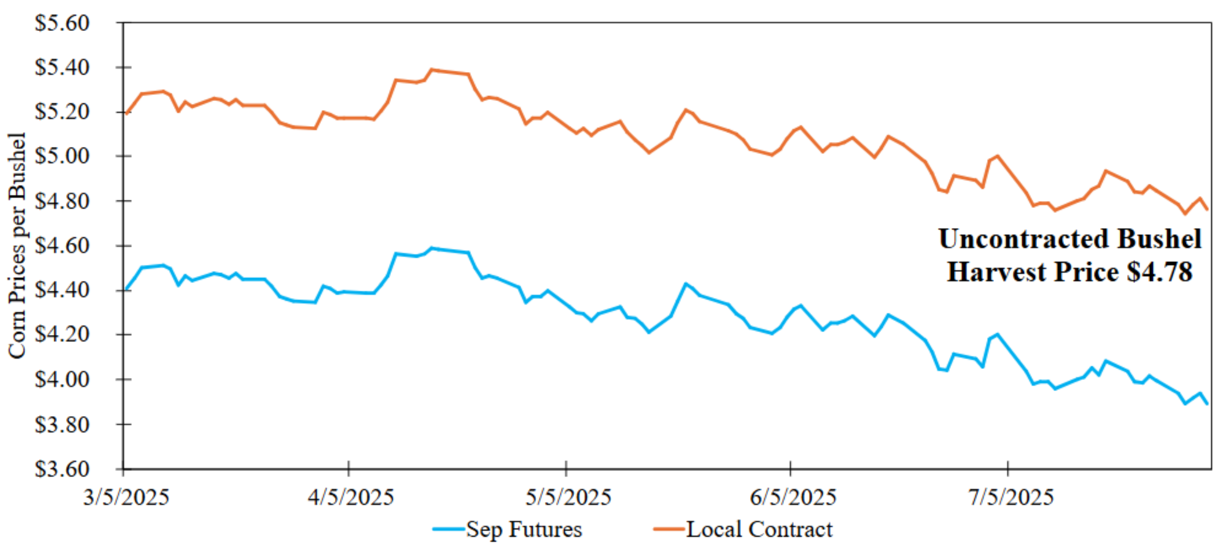


Figure 6. 2025 Corn STEP Prices and the September Futures Price ($/bu).

Other Management Decisions:

All management practices not explicitly designated as decision variables in the 2025 STEP competition including pesticide applications, tillage operations, residue management, planting operations, and harvest procedures—were standardized and implemented uniformly across all experimental plots by the University of Florida STEP project team. This approach ensured consistency in field operations and minimized variability unrelated to participant decision-making.

The STEP project team was responsible for conducting all physical field operations, including the operation of farm machinery, management of the irrigation system, application of fertilizers and crop protection chemicals, and grain harvest. Centralizing these operations ensured accurate implementation of management decisions and maintained experimental integrity across all teams.

Participating teams made their designated variable management decisions including nitrogen application strategies, irrigation scheduling, insurance selection, and grain marketing in real time using a secure, web-based submission platform hosted on the STEP website (https://step.ifas.ufl.edu/). Access to the decision platform was provided to all teams at the beginning of the competition, allowing timely submission of management choices throughout the growing season.

Competition plots remained open and accessible to participating teams for observation and data collection during the season. This access enabled teams to visually assess crop development, verify field conditions, and collect supplemental information to support adaptive decision-making. Together, this framework balanced experimental control with participant engagement, ensuring that differences in outcomes were attributable to management decisions rather than operational variability.

Data collection:

The core objective of the Florida Stakeholder Engagement Program (STEP) is to test, observe, and implement emerging water- and nutrient-conservation technologies and management practices within a controlled, risk-free environment. The 2025 Corn STEP competition continued this approach by integrating agronomic, environmental, and remote-sensing data streams to support informed decision-making by participating teams.

To support irrigation management, one set of soil moisture sensors selected by each team from the available sensor platforms was installed within one replication assigned to that team. These sensors provided continuous monitoring of soil water status at multiple depths, and the resulting data were made available to teams in real time for use in irrigation scheduling decisions.

To help teams make informed decisions, multiple agronomic datasets were collected throughout the corn growing season. These included crop growth measurements (e.g., plant height and growth stage observations, plot photographs), soil samples, and leaf tissue samples collected at key growth stages (Figure 7). Soil and tissue samples were submitted to Analytical Services Laboratories, UF for nutrient analysis. Analytical results were shared with participating teams to inform in-season nitrogen management decisions and to evaluate nutrient status across treatments.

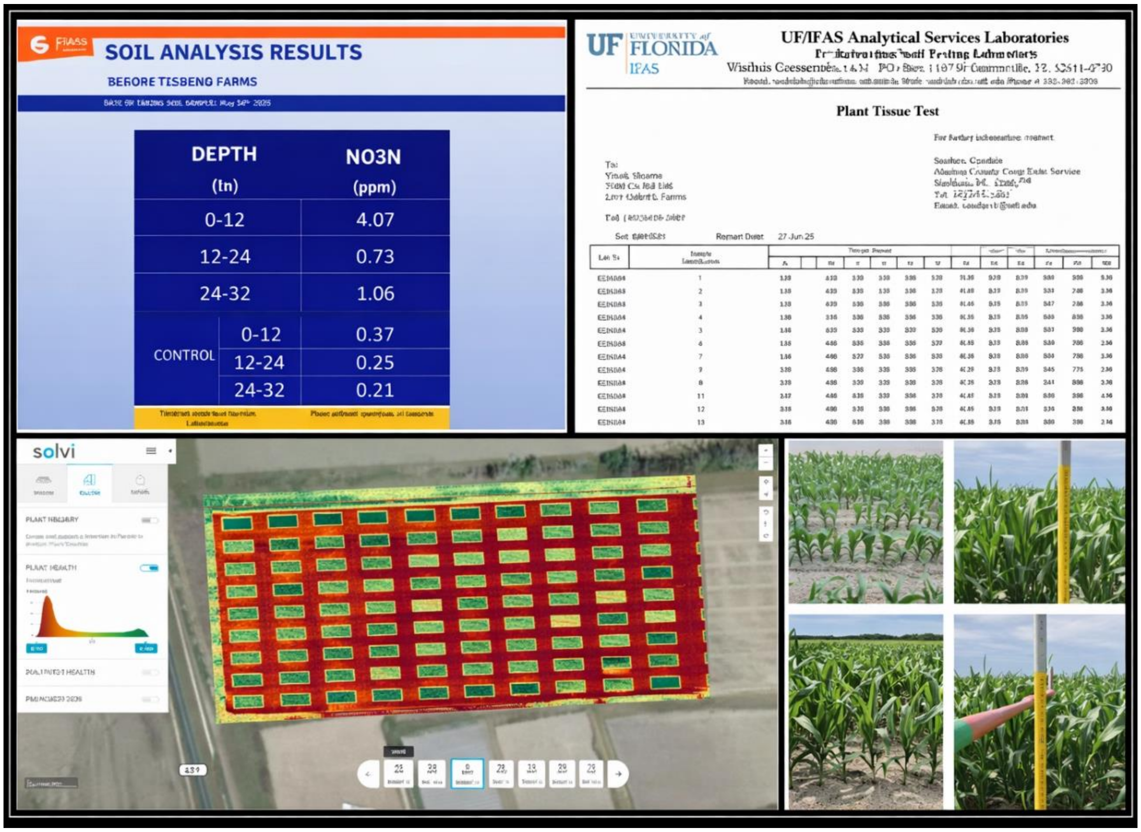


Figure 7. Ag. Technologies and Data availability to support participants decision-making.

In addition to ground-based measurements, unmanned aerial vehicle (UAV) imagery (Figure 7) was collected periodically throughout the growing season. Drone imagery was processed using the SOLVI platform, generating spatial information on vegetative indices and thermal characteristics. Processed imagery and derived indices were shared with participating teams through the SOLVI web interface to support assessment of crop vigor, spatial variability, and potential stress patterns.

All agronomic, environmental, and remote-sensing data generated during the season were compiled and distributed to participating teams through the STEP web platform (https://step.ifas.ufl.edu/). This centralized data-sharing approach ensured timely access to information and facilitated adaptive, data-driven decision-making throughout the competition.

Awards Selection Criteria and Performance Ranking

In contrast to previous STEP competitions, where awards were presented separately for individual performance categories, the 2025 STEP competition adopted a unified award framework to better reflect real-world farm management objectives. Rather than recognizing top performers independently for profitability or efficiency alone, five award winners were selected based on a composite performance ranking that integrated both economic profitability and input-use efficiency. This revised approach was implemented to emphasize the importance of balanced management strategies that simultaneously optimize yield, resource-use efficiency, and economic outcomes. The 2025 award framework therefore discouraged single-metric optimization and instead rewarded teams demonstrating strong overall system performance.

Profitability Component:

Profitability was evaluated using simulated gross profit per acre, calculated for each team based on production and marketing outcomes from the simulated 1,000-acre corn operation. Gross profit per acre was calculated as:

$$\begin{aligned}\text{Gross Profit }(\$/\text{ac})\\ &= [\text{Yield (bu/ac)} \times \text{Average Farm-Gate Price }(\$/\text{bu})]\\ &- \text{STEP Variable Costs }(\$/\text{ac}) - \text{Fixed Production Costs }(\$/\text{ac})\end{aligned}$$

Grain yield (bu/ac) was calculated as the average harvested yield from each team's research plots, standardized to 15.5% grain moisture, and scaled to a 1,000-acre operation. The average farm-gate price was determined by each team's grain marketing decisions and calculated as the weighted average delivered price, minus a $0.30 per bushel hauling charge.

Variable production costs reflected team-specific management decisions and included expenses associated with seed, fertilizer, irrigation, insurance premiums, and grain marketing penalties, where applicable. Seed costs for the selected hybrids were standardized and are presented in Figure 1. The starter fertilizer application was treated as a fixed cost and was identical across all teams.

Table2. In-season fertilizer costs varied by fertilizer source and application method. Prices used in the 2025 competition were as follows:

Fertilizer Material Type	Cost per lb of Nitrogen	Cost per Ton Delivered
Ammonium nitrate-sulfate blend 30-0-0-7	$0.74	$445
UAN 28% with sulfur 28-0-0-5	$0.59	$329
Harrell's CRF 43-0-0	$1.37	$1175
Pursell's CRF 44.5-0-0	$1.01	$900
Florikan CRF 43.75-0-0	$1.30	$1141
Fertilizer Application Type	**Cost per Application**	
Broadcast application of dry fertilizer or CRF	$7.00/acre per application	
Banding application of dry fertilizer or CRF	$14.00/acre per application	
Liquid side-dress application of 28-0-0-5	$12.00/acre per application	

Fertilizer application costs were standardized at $14/ac per application for side-dress applications of ammonium nitrate or CRF, $7/ac per application for broadcast applications, and $12/ac per application for liquid side-dress applications of UAN(Table 2). Irrigation costs were established at $11 per acre-inch of water applied.

Efficiency Component:

Input use efficiency was evaluated using the Water Nitrogen Intensification Performance Index (WNIPI), an integrated metric that combines the Water Intensification Performance Index and the

Nitrogen Intensification Performance Index (Lo et al., 2019). The WNIPI was used to quantify how effectively each team converted irrigation water and nitrogen inputs into grain yield relative to the zero-input control treatment.

The WNIPI is designed to promote efficient management of both irrigation and nitrogen fertilizer while maintaining production, and it equally weights the influence of water and nitrogen inputs. A higher WNIPI value indicates greater efficiency in converting additional inputs into yield, whereas lower values indicate reduced efficiency.

The WNIPI was calculated as:

$$\text{WNIPI} = \frac{(\frac{Y - Y_n}{Y_n})}{(\frac{ET_n + I}{ET_n}) * (\frac{G_n + N}{G_n})}$$

where
Y = grain yield of the evaluated farm (bu/ac);
Y_n = grain yield of the zero-input control farm (bu/ac);
ET = crop evapotranspiration of the evaluated farm (mm);
ET_n = crop evapotranspiration of the zero-input control farm (mm);
G_n = grain nitrogen uptake of the zero-input control farm (kg N/ha);
N = fertilizer nitrogen applied by the evaluated farm (kg N/ha).

Grain yield was standardized to 15.5% moisture, and crop evapotranspiration for the control treatment was calculated using a water balance approach.

Integrated Award Ranking:

For the 2025 competition, team rankings were determined using a relative performance index that combined normalized profitability and WNIPI values. This composite index ensured that neither profitability nor efficiency alone dominated the final rankings. Instead, teams achieving strong performance across both dimensions were rewarded.

Based on this integrated ranking, five award winners were selected to represent the top performing teams in the 2025 STEP competition. These teams demonstrated superior ability to balance yield, irrigation and nitrogen efficiency, and economic performance under irrigated corn production systems in North Florida.

This revised award structure reinforces the core STEP principle that long-term agricultural sustainability depends on integrated, systems-based decision-making rather than single-metric optimization.

2025 Competition Results

Timeline of Activities:

The 2025 Florida Stakeholder Engagement Program (STEP) corn competition followed a structured timeline encompassing field establishment, data collection, technology deployment, stakeholder engagement, and harvest operations at the UF/IFAS North Florida Research and Education Center – Suwannee Valley (NFREC-SV), Live Oak, Florida.

A pre planting soil sampling was conducted a week before the corn planting as the report was shared with all the participants for them to have a baseline of the soil strength in mid-March (Figure8). Following plot establishment on March 19th, 2025 (Figure 9), soil moisture sensor installation was conducted during the first week of April, 2025, as 18 participating teams elected to use soil moisture–based irrigation scheduling. A total of 19 soil moisture sensors were installed across designated plots, including 14 BMP Logic sensors and 5 Aqua Spy sensors (Figure 10). Individual login credentials were created and shared with participants, providing no-cost access to real-time soil moisture data for irrigation decision-making throughout the season. A corn stand count assessment was conducted on April 7, 2025, and the corresponding report was uploaded to the STEP web portal on April 11th , 2025 (Figure 11). This early-season assessment provided teams with baseline crop establishment information to support subsequent management decisions. Soil and plant tissue sampling was conducted periodically throughout the growing season at key corn growth stages to support nutrient management decisions. Sampling dates are summarized below:

Table3. Dates of Soil and plant tissue sampling throughout the 2025 growing season

Soil Sampling Date	Plant Tissue Sampling Date
April 16, 2025	April 24, 2025
April 28, 2025	May 8, 2025
May 14, 2025	May 19, 2025
May 30, 2025	June 11, 2025
June 16, 2025	June 26, 2025
July 9,2025	July 26,2025

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2025 Corn STEP Contest Pre-Planting Soil test Results

Date of sampling: 03.19.2025

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Site#	Depth (in)	K (mg/kg)	NO3N (mg/kg)	P (mg/kg)
1	12	16.58	1.73	4.96
1	24	6.45	0.25	3.91
1	36	5.59	0.49	2.09
2	12	11.48	1.66	4.53
2	24	11.08	0.98	4.22
2	36	10.2	1.16	3.15
3	12	19.17	2.74	9.23
3	24	9.34	0.47	5.89
3	36	10.26	0.36	4.3
4	12	26.5	1.25	5.91
4	24	9.66	0.35	7.3
4	36	6.83	0.23	6.76
5	12	14.69	1.02	7.35
5	24	15.38	0.14	5.55
5	36	12.18	0.2	7.56
6	12	26.81	1.34	6.51
6	24	8.92	0.29	5.29
6	36	11.35	0.19	5.81
8	12	20.52	1.6	7.7
8	24	16.46	0.43	5.71
8	36	17.22	0.28	6.99
7	12	22.74	2.26	8.13
7	24	9.51	0.27	4.37
7	36	8.14	0.84	3.23
9	12	14.19	0.75	11.12
9	24	13.25	0.34	5.79
9	36	16.35	0.13	7.51

UF/IFAS Analytical Services Laboratories	Please address questions or concerns to:
Analytical Research Laboratory	Laboratory Manager
631 Wallace Building	Tel: 352 - 392 - 1950
P.O. Box 110740	Email: arl@mail.ifas.ufl.edu
Gainesville, Florida 32611-0740	Web: arl.ifas.ufl.edu

Figure 8. Pre Planting Soil Analysis report of the STEP 2025 field on 03.19.2025.

Figure 9. Sowing of Corn STEP 2025 plots being conducted on 03.19.2025.

Figure 10. Installation of Soil Moisture Sensors in the Corn STEP 2025 plots in April 2025.

UF|IFAS
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UF TAPS
TESTING AG PERFORMANCE SOLUTIONS

Florida Stakeholder Engagement Program (STEP)
2025 Corn Contest

Seedings Rate Results

Team SEAL:

Replications	Plants per 17.5 ft	Plants per Acre	Seeding rate/acre	Emergance Rate %
Plot 1	30	30,000	32000	93.75%
Plot 2	32	32,000	32000	100.00%
Plot 3	32	32,000	32000	100.00%
Plot 4	31	31,000	32000	96.88%
Avg	**31.3**	**31,300**		**97.66%**

Figure 11. Taking stand count data on April 7th and the uploaded germination report.

Between April 24 and July 8, 2025, a total of seven drone flights were conducted over the STEP competition plots. Vegetative indices, including Normalized Difference Vegetation Index (NDVI) and Normalized Difference Red Edge (NDRE), were derived from these flights and uploaded to the SOLVI platform for team access.

In addition to aerial data collection, weekly crop photographs were taken for each team's plots from growth stages V4 through R6. Photographs were captured from multiple angles, including side-by-side comparisons with control plots, to document crop height, canopy development, and overall crop condition throughout the season (Figure 12). All irrigation inputs submitted by participating teams were applied using a variable rate irrigation (VRI) lateral system (Figure 13). Nitrogen fertilizer applications were implemented at designated crop growth stages using a fertilizer broadcaster and high-clearance applicator (highboy) to ensure accurate and uniform application across treatments (Figure 4). A single herbicide application consisting of glyphosate (Roundup) at 1.5 qt/ac and AIM at 2 oz/ac was applied using a drop sprayer on June 26th , 2025, and was standardized across all plots. The Corn STEP competition plots were showcased during multiple outreach and training events. The plots were featured during the VIP Research and Extension Pre-Suwannee CARES Tour on May 1st ,2025(Figure 14). Field demonstration. of the STEP program was also convened at the Agronomic Corn In-Service Training on July 16th, 2025, followed by the Corn Field Day on July 17th, 2025, at NFREC-SV (Figure 15). These events provided opportunities for growers, extension personnel, and industry representatives to observe plot performance and engage with STEP participants. Harvesting of the Corn STEP competition plots was completed by July 30th, 2025, along with the data collection, hence concluding the field phase of the 2025 competition (Figure 16-17). The completion of harvest marked the transition to data synthesis, analysis, and evaluation of agronomic, efficiency, and economic outcomes.

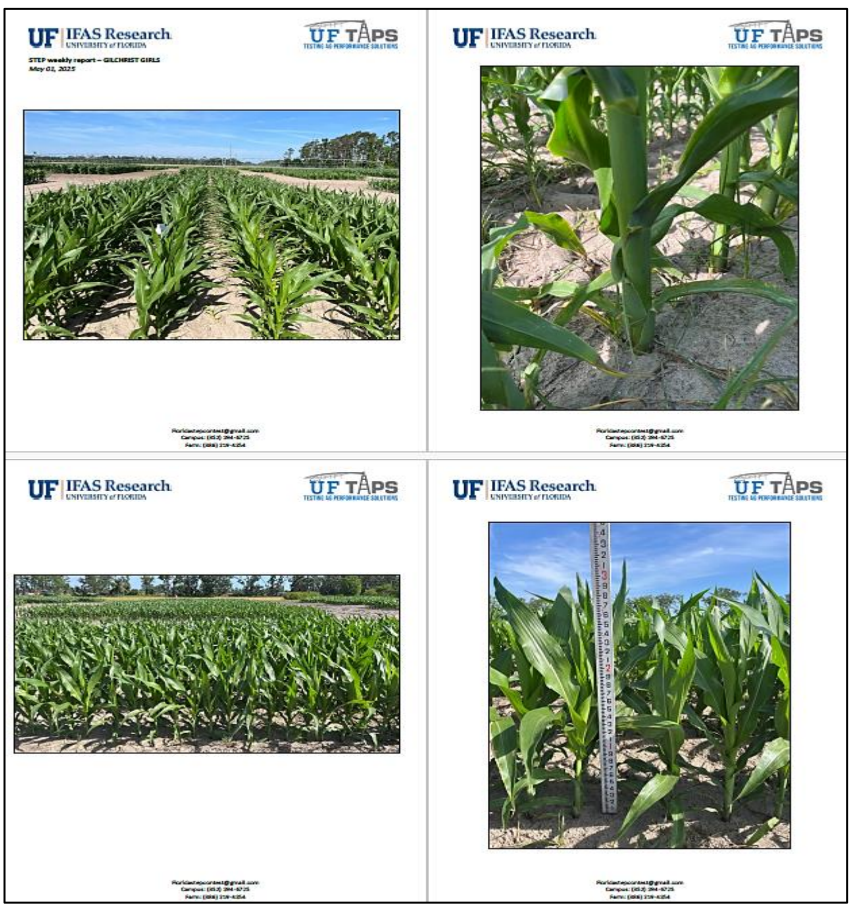

Figure12. Weekly photographs to determine crop health and vigor.

Figure 13. Irrigation applications using the VRI system.

Figure 14. Presenting STEP at the VIP Research and Extension Pre-Suwannee CARES Tour on May 1st ,2025.

Figure 15. Demonstration of Corn STEP competition plots during the Agronomic Corn In-Service Training Conducted on 7.16.2025 (left) and Corn Field Day on 7.17.2025(right).

Figure 16. Harvesting of 2025 Corn STEP contest plots at NFREC, Live Oak (07.30.2025).

Figure 17. During Harvest data collection of 2025 STEP plots at NFREC, Live Oak.

Weather Conditions:

Weather conditions during the 2025 Corn STEP competition were characterized by high intra-seasonal variability in rainfall distribution, with several isolated precipitation events occurring during early and mid-season, followed by increased rainfall frequency toward late June and July (Figure 18).

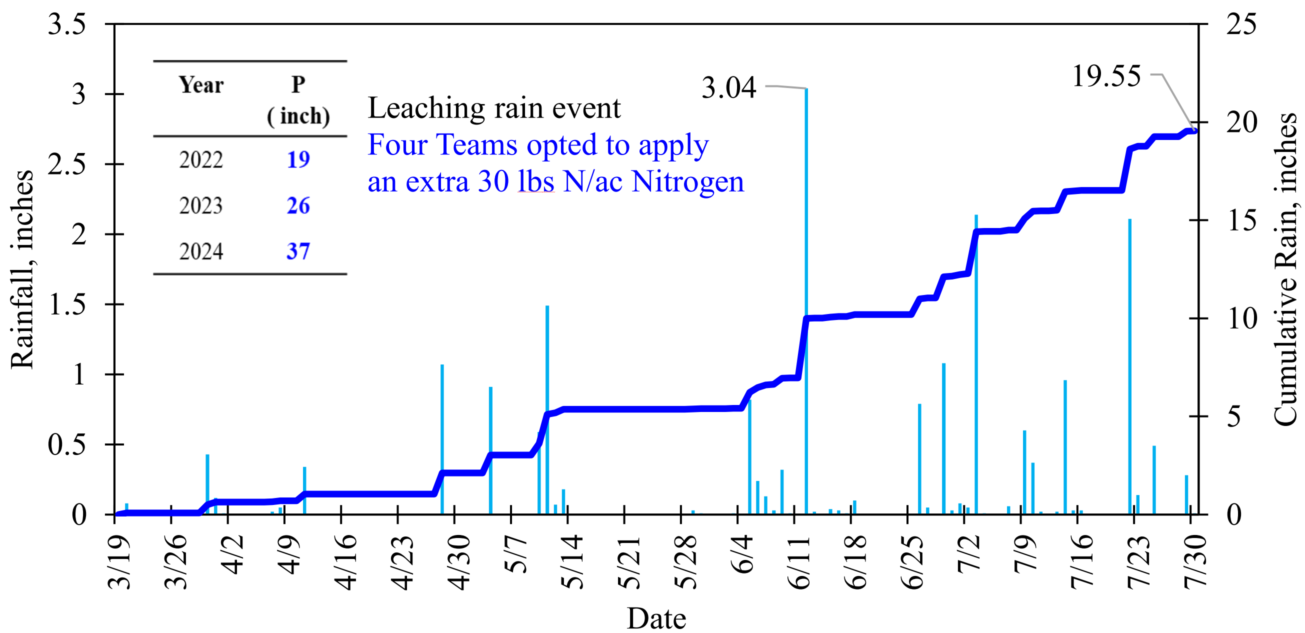

Figure 18. Daily and cumulative seasonal rainfall from planting to harvesting at the NFRECSV, Live Oak, FL.

From planting through physiological maturity, the site received a cumulative rainfall of approximately 19.6 inches, as recorded by the on-site weather station. Rainfall during the early vegetative growth period (late March through mid-April) was limited, resulting in minimal natural soil water recharge and increasing reliance on irrigation inputs during crop establishment. Moderate rainfall events were observed during late April and early May, contributing to gradual increases in cumulative precipitation reaching thresholds associated with nutrient leaching risk.

A major leaching rain event was recorded on June 11, 2025, during which a single-day rainfall total of 3.04 inches was observed. This event exceeded the threshold commonly used to classify rainfall as potentially leaching under the sandy soils of the Suwannee Valley region. At the time of this event, cumulative rainfall since planting had reached approximately 10 inches, and the corn crop was in the rapid vegetative growth stage. As a result of this event, four participating teams opted to apply an additional 30 lb N/ac under the competition's leaching rain contingency provision.

Following the leaching rain event, rainfall remained sporadic through mid-June before increasing in frequency and intensity from late June through July. Several rainfall events exceeding 1.0 inch per day were recorded during this period, contributing substantially to cumulative precipitation totals. By the end of July, cumulative rainfall had reached approximately 19.55 inches, with most of the late-season precipitation occurring after the completion of most in-season nitrogen applications.

No extreme wind or storm events resulting in widespread lodging or structural crop damage were observed during the 2025 growing season. Minor, localized impacts such as temporary leaf tearing and slight canopy displacement were noted following isolated storm events but did not result in measurable yield loss across treatments.

Overall, the 2025 season provided a challenging but realistic weather environment for evaluating irrigation and nitrogen management strategies under the STEP framework. The occurrence of a well-defined leaching rain event, followed by a wetter late season, offered participating teams a valuable opportunity to assess risk responsive nutrient management decisions under real world conditions.

Management Decisions results:

Hybrid selection

Hybrid selection was an important early-season decision in the 2025 Corn STEP competition because it influences yield potential, stress tolerance, and overall production cost. To keep the contest comparable while still allowing flexibility, Pioneer P2042VYHR was provided as the only default hybrid for all participating teams, and any other hybrid selections were provided independently by growers. A strong preference for the default option was observed in 2025 (Figure 19). Pioneer P2042VYHR (MSRP $372) was selected by 14 teams, A limited number of teams chose to bring in alternative hybrids at their own expense, adding a small but valuable range of genetics for comparison under the same field environment and contest rules. These included

Agretech 815AVIP (MSRP $260), Agrigold 644-64VT (MSRP $386), Integra 6915 VT2P (MSRP $338), Pioneer P1622VYHR (MSRP $395), and Pioneer 1511 (MSRP $400), each selected by one team (Figure 19).

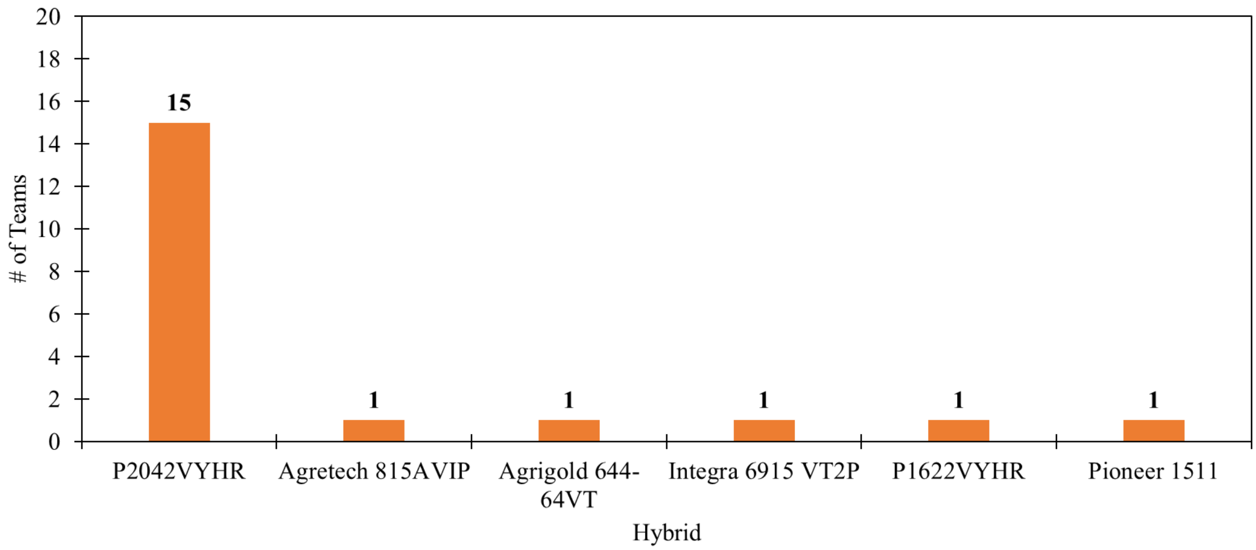

Figure 19. Hybrid selected in the 2025 STEP competition.

Overall, the 2025 hybrid selection outcomes show that most teams converged on the single default hybrid provided, while a few teams chose to experiment with other genetics using grower-purchased seed. This approach-maintained consistency across the contest while still capturing how hybrid choice can interact with team management decisions and seasonal conditions.

Nitrogen Application

All competition plots received 13 gal/ac of starter fertilizer (23-9-0), equivalent to ~30 lb N/ac, applied at planting to support early crop establishment. Beyond this uniform starter application, teams had the flexibility to design in-season nitrogen programs using multiple fertilizer sources and application approaches. Nitrogen sources available to teams included granular ammonium nitrate (30-0-0-7), UAN 28% with sulfur (28-0-0-5) applied as a liquid, and controlled-release fertilizer (CRF blends: 43.75-0-0 from Florikan and 44.5-0-0 from Pursell). Fertilizer was implemented using three primary application methods: (i) broadcast, (ii) banding, and (iii) liquid side-dressing using the Miller High-Boy 360 Y-Drop system, depending on each team's strategy and timing.

Across the competition, total nitrogen application rates varied widely, ranging from 150 lb N/ac (Team A) to 340 lb N/ac (Team F), reflecting different management philosophies regarding risk tolerance, yield targeting, and investment input (Figure 20). Several teams clustered near the upper end of nitrogen application (e.g., Teams B = 330, I = 310, J = 300), while others implemented comparatively conservative programs (e.g., Teams E = 195, D = 166, S = 155). While seven teams chose to go with the CRF management system (i.e. B, H, I, K, N, O and R), the remaining choose to go with the conventional fertilizer management.

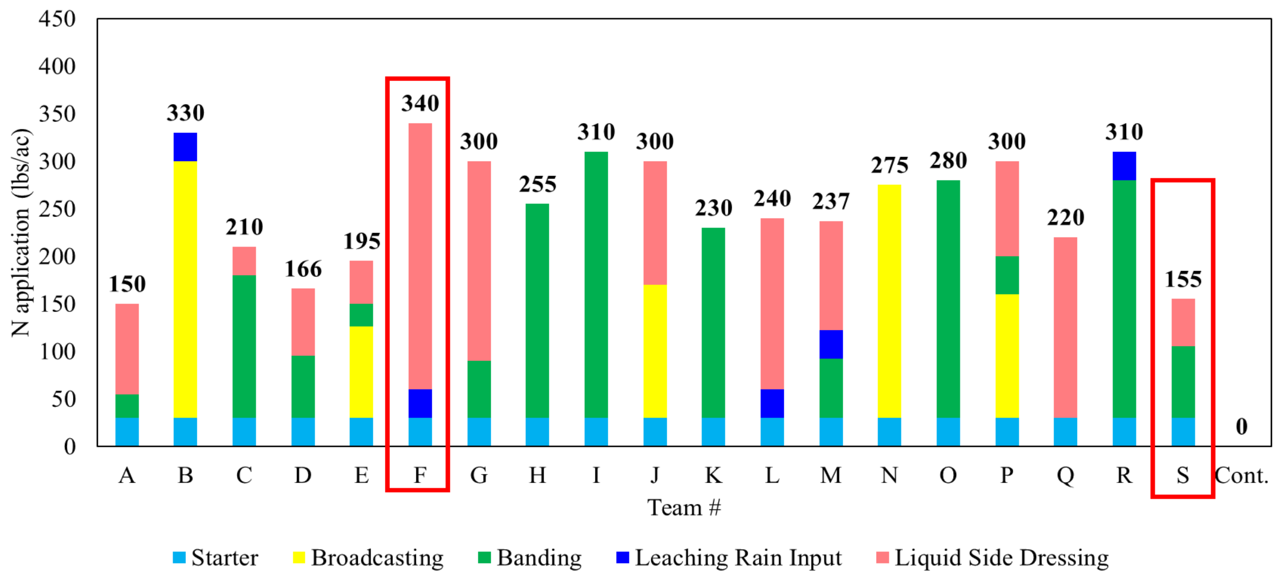

Figure 20. Nitrogen application method and amount (lbs of N/ac) for the participating teams.

The distribution of nitrogen among application methods also differed substantially among teams (Figure 20). Liquid side-dressing represented the most variable component of nitrogen programs, ranging from 30 to 280 lb N/ac, which corresponded to approximately 9% to 91% of total N applied, depending on the team. For example, Teams F (280 lb N/ac liquid) and Q (190 lb N/ac liquid) relied heavily on liquid side-dressing as their primary in-season nitrogen delivery strategy, whereas Teams such as S and C used liquid side-dressing at relatively low levels (30 – 50 lb N/ac) as a supplemental component.

Broadcast applications ranged from 25 to 270 lb N/ac, with Teams B (270 lb N/ac) and Q (245 lb N/ac) allocating most of their in-season nitrogen through broadcast delivery. In contrast, banded applications ranged from 24 to 280 lb N/ac, and were the primary strategy for Teams such as O (280 lb N/ac banded) and S (250 lb N/ac banded), indicating a preference for placing nitrogen closer to the row to improve early uptake efficiency and reduce exposure to surface losses. Overall, the 2025 nitrogen management results demonstrate substantial variation in both total nitrogen rates and method of application, providing a strong comparison framework for evaluating how nitrogen strategies influenced yield, profitability, and efficiency outcomes under the STEP competition environment

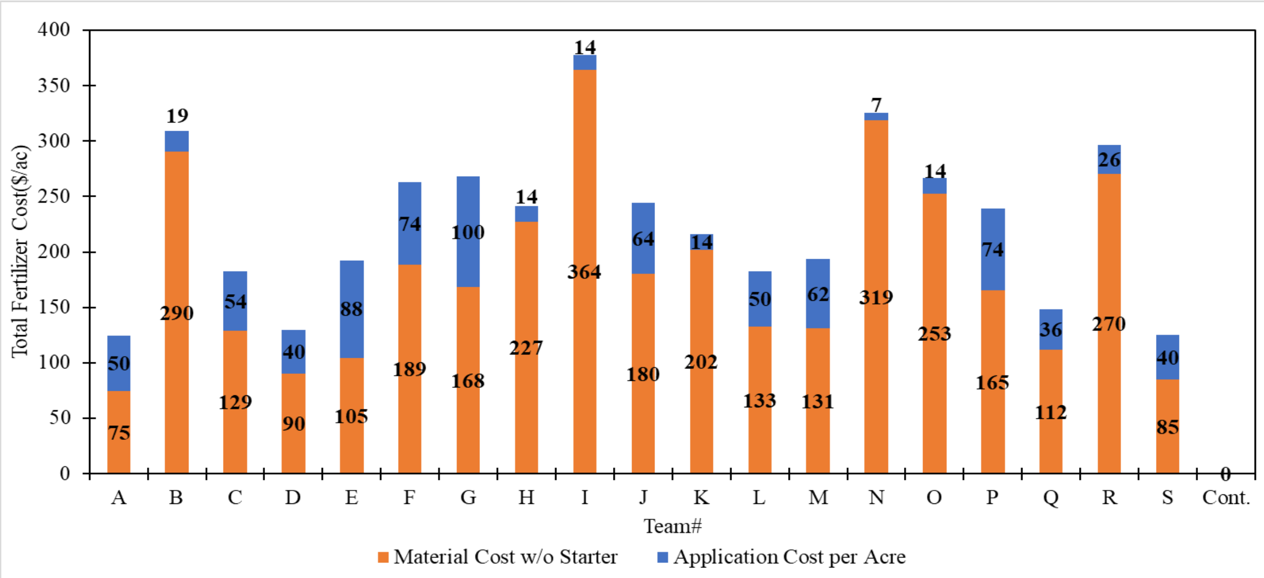

Figure 21. Fertilizer material and application cost ($/ac) for the participating teams.

Further, fertilizer costs were calculated on a per-acre basis using each team's selected fertilizer materials, total nitrogen applied, and the number and type of application events. Total fertilizer cost per acre was partitioned into (i) material cost and (ii) application cost, where material cost represents the purchased nutrient products (e.g., ammonium nitrate, UAN, and/or CRF), and application cost represents operational charges associated with the application method(s) (e.g., broadcast, banding, and liquid side-dress events). Across teams, total fertilizer costs ranged from \$125/ac to \$378/ac, with material costs ranging from \$75/ac to \$364/ac (not including the starter fertilizer) and application costs ranging from \$7/ac to \$100/ac (Figure 21). Differences in total fertilizer cost were primarily driven

by variation in fertilizer source pricing (conventional vs. CRF), total nitrogen rate, and the number of in-season applications required to implement each team's fertilizer program.

Irrigation Management

Before the start of the competition, participating teams selected their preferred method of irrigation scheduling. All teams opted for soil moisture–based irrigation scheduling, and each team was provided access to real-time soil moisture data through the selected sensor platform. Teams were allowed to apply 0 to 0.5 inches of irrigation per event in 0.05-inch increments throughout the growing season. As shown in Figure X, total seasonal irrigation applied varied substantially among teams, ranging from 1.0 inch (Team N) to 18.2 inches (Team F). Most teams initiated irrigation soon after planting and concentrated a large share of irrigation during May and June to minimize water stress during rapid vegetative growth and the transition into reproductive stages. In contrast, many teams reduced irrigation later in the season and relied more heavily on rainfall during late June and July (Figure 22).

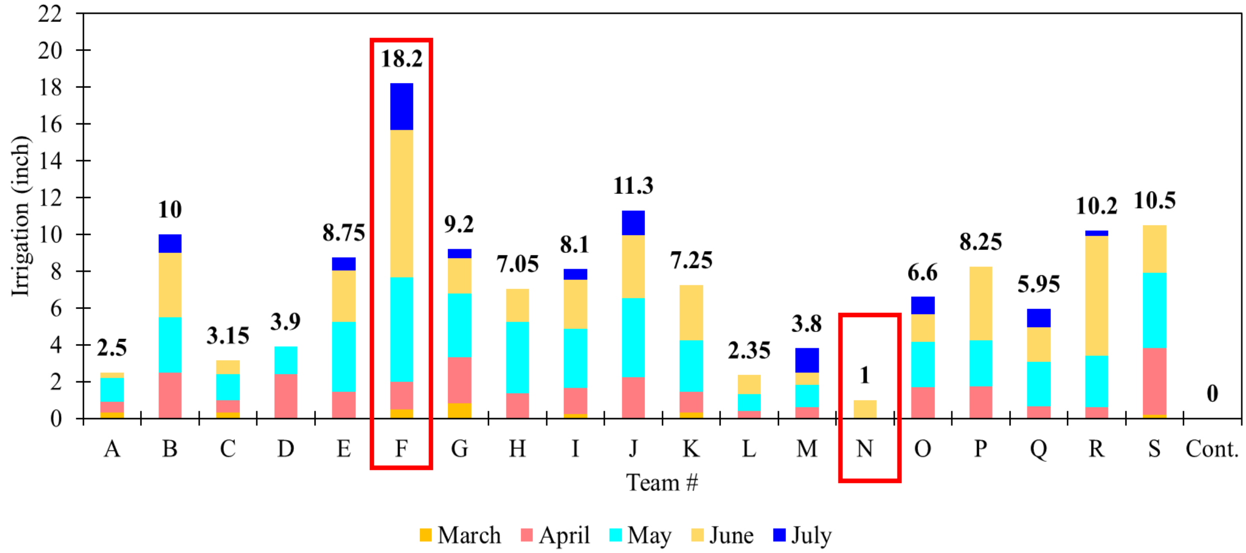

Figure 22. Monthly and cumulative season irrigation applied by the participating teams.

Irrigation costs were estimated using the established operational cost rate of $11 per acre-inch of water applied. Based on the total seasonal irrigation depth reported for each team, total irrigation cost ranged from $11/ac (Team N) to $200/ac (Team F), with several teams also exceeding $100/ac (e.g., Teams B = $110/ac, J = $124/ac, R = $112/ac, and S = $116/ac) (Figure 23). Overall, the wide range in irrigation cost reflects substantial differences in irrigation strategy among teams, including how aggressively irrigation was applied and how each team adjusted to rainfall during the season.

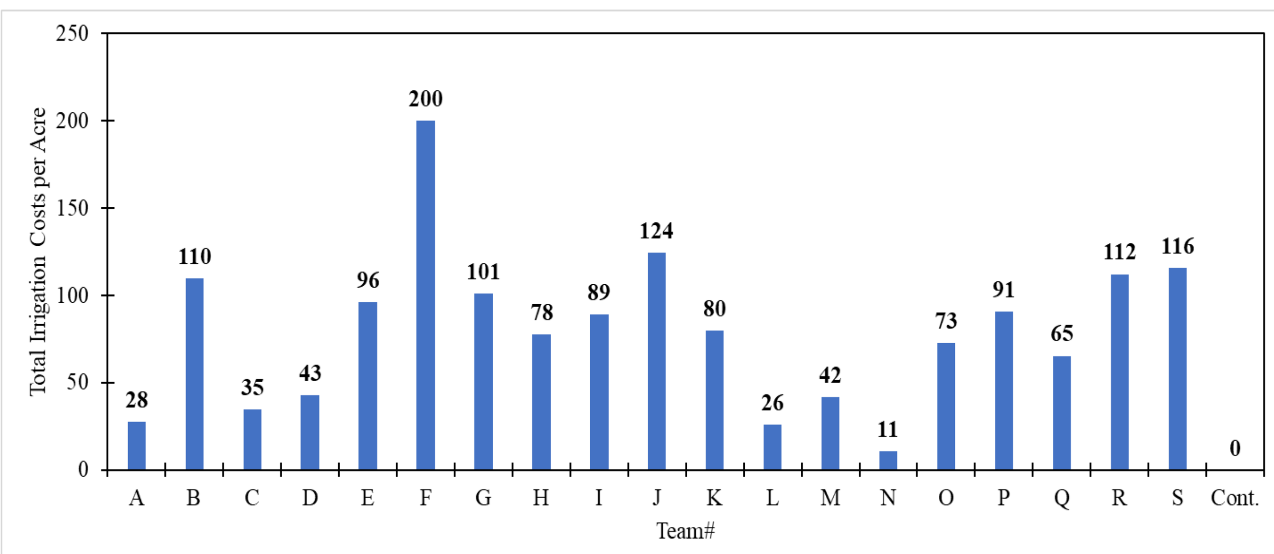

Figure 23. Total irrigation cost ($/ac) for the participating teams.

Insurance Selection

Teams were required to select a multi-peril crop insurance plan by the insurance decision deadline, choosing between Yield Protection (YP) and Revenue Protection (RP). As shown in Figure 24, the majority of teams selected Yield Protection, with most opting for a 50% coverage level (premium \$2.28/ac). A smaller number of teams selected higher YP coverage levels, including 60% coverage (premium \$4.13/ac) and 75% coverage (premium \$11.69/ac), reflecting different levels of risk management preference across participants.

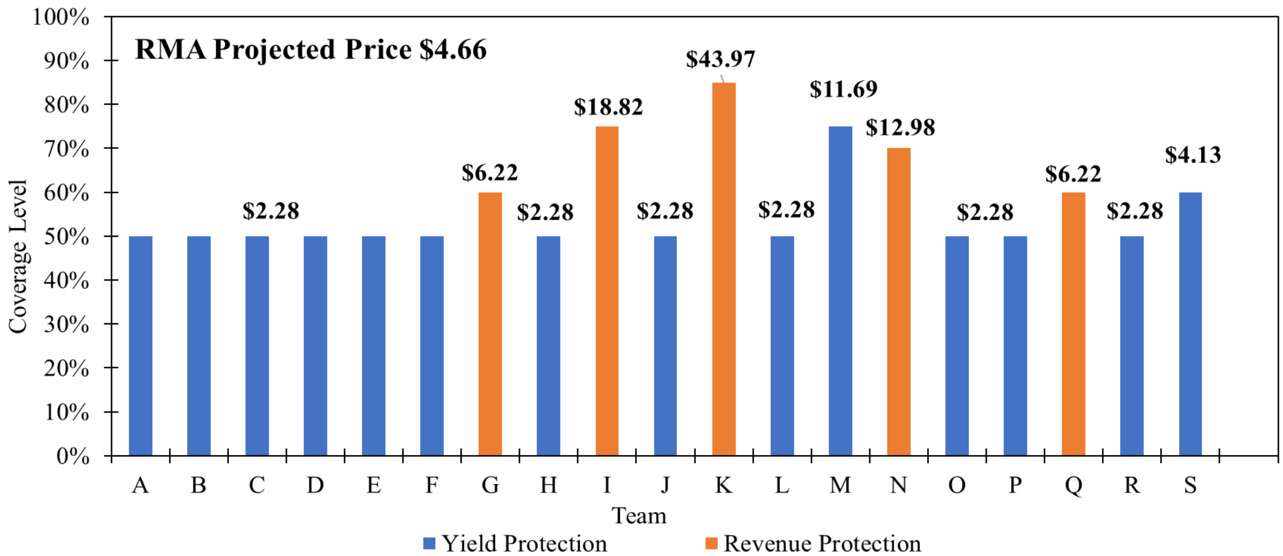

Figure 24. Insurance selections by team, their coverage, and premium per acre

In contrast, Revenue Protection was selected by a limited subset of teams, but those teams generally chose higher coverage levels—including 60% coverage (premium \$6.22/ac), 70% coverage (premium \$12.98/ac), 75% coverage (premium \$18.82/ac), and 85% coverage (premium \$43.97/ac) (Figure 24). Overall, the insurance decisions indicate that most teams prioritized minimizing premium costs, while only a few teams invested in higher-coverage RP policies that provide stronger protection against both yield losses and adverse price movements during the season.

Grain Marketing

Each team was responsible for marketing corn from a simulated 1,000-acre farm. The total bushels marketed were calculated as the team's average plot yield per acre (standardized to 15.5% grain moisture) multiplied by 1,000 acres. The simulated grain was assumed to be delivered to a local buying point during the week of harvest; therefore, no on-farm storage, drying, or long-distance transportation options were permitted.

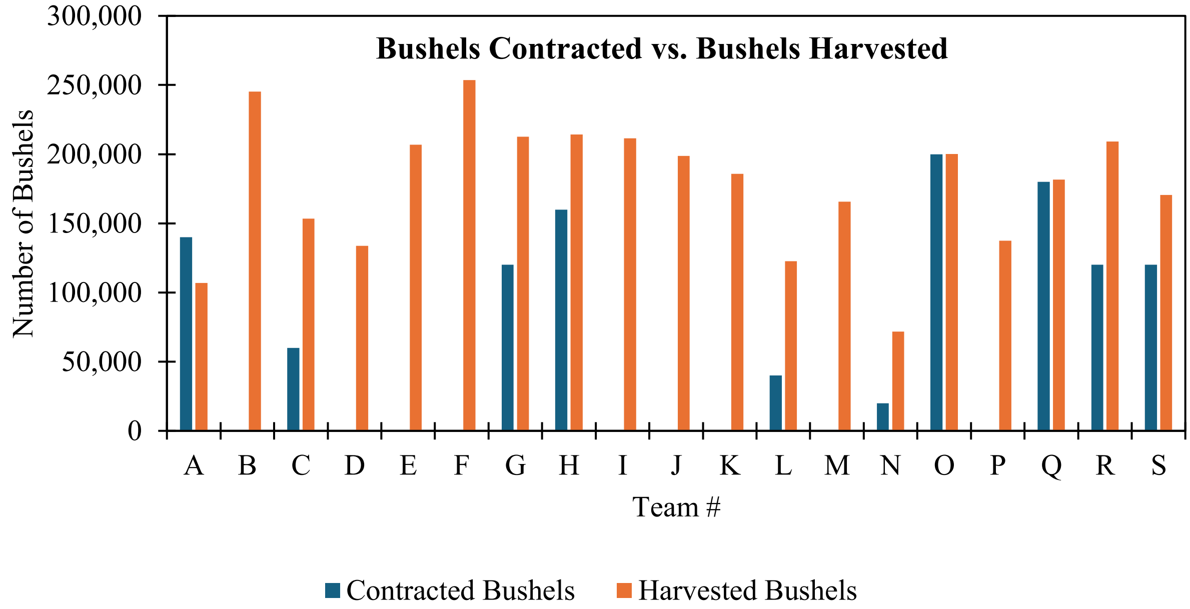

Figure 25. Actual bushels harvested compared to the number of contracted bushels marketed per team

Teams could forward-price corn using flat-price or basis contracts (in 10,000-bushel increments) between the start of the contest and plot harvest. Forward contract prices were determined using the daily closing Chicago Board of Trade (CBOT) September futures contract price and a local basis posted weekly on the STEP website. Any bushels not sold through contracts were "sold" at the average spot market price during the harvest week. In 2025, the harvest-week spot price used for uncontracted grain was $4.78/bu (Figure 6: contract price time series, and Figure 27: team average price).

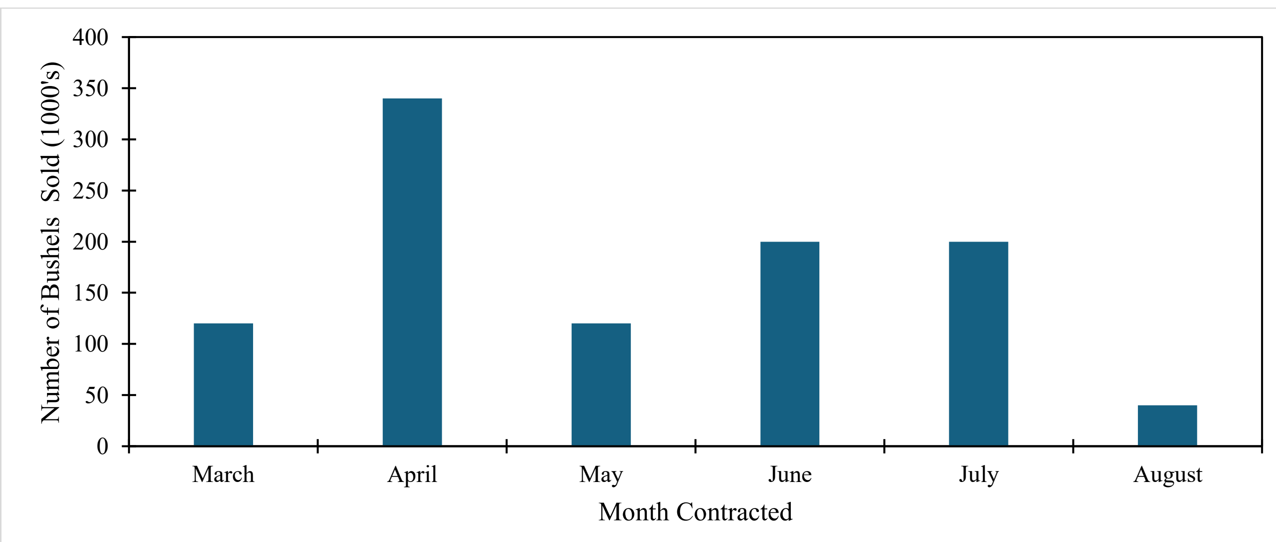

Figure 26. Bushels contracted and sold by month in 2025 Corn STEP contest.

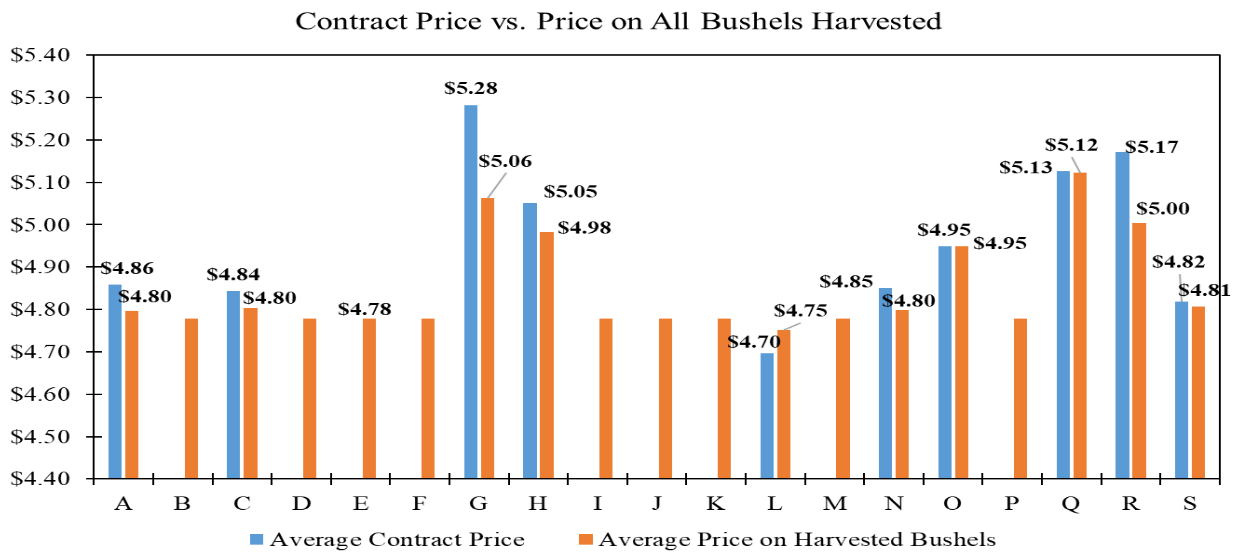

Figure 27. STEP 2025 teams average contract price and harvest price per bushel

Contracting activity: bushels contracted vs. harvested

Teams used noticeably different contracting strategies (Figure 25). Several teams did not forward-contract and marketed essentially all production at the harvest-week spot price. In contrast, a smaller group contracted a substantial portion of production—ranging from partial contracting (e.g., ~40–160K bu) to near-full contracting (~180–200K bu). One team over-contracted, where contracted bushels exceeded harvested bushels, which triggered settlement/penalty provisions under contest rules (Figure 25: contracted vs. harvested).

Price outcomes across teams

Average marketing outcomes are summarized in Figure 27: Average Contract Price vs. Average Price on All Bushels Harvested. Across the season, the team's average contract prices ranged approximately from $4.70/bu to $5.28/bu, reflecting the timing of contracting relative to market movement. Because many teams marketed most or all grain at harvest, their average price on all bushels harvested clustered near the harvest-week spot value (~$4.78/bu). Teams that contracted earlier at stronger prices achieved higher weighted average delivered prices. The highest overall average prices per harvested bushel were achieved by Team Q (~$5.12/bu), followed by Team G (~$5.06/bu) and Team R (~$5.00/bu)

Seasonal price context (2025 vs. prior years)

The 2025 local contract price trajectory (Figure 5) showed a generally softening market through the season, with stronger opportunities earlier (spring) and weaker prices approaching harvest. Compared with 2022 and 2023, 2025 contract prices were lower overall and trended down into late season, increasing the value of timely contracting for teams seeking to protect price and improve net returns. Overall, the 2025 marketing results highlight that teams who contracted meaningful bushels earlier were better positioned to achieve higher average delivered prices, while teams that remained mostly uncontracted were largely exposed to the lower harvest-week spot market (Figure 25: bushels contracted vs. harvested; Figure 27: average contract vs. harvested price; Figures 5 and 6: contract price trends).

Grain Yield Response

In 2025, Grain yield across participating teams ranged from 107 to 254 bu/ac (Figure 28) with an overall average yield of 178 bu/ac. Team F reached the highest yield of 254 bu/ac with hybrid Pioneer 1511 followed by Team B(245 bu/ac) and Team H(214 bu/ac), while Team N had the lowest yield of 72 bu/ac considering the fact that it applied only one inch of irrigation following the CRF application of 275 lbs/ac. Yield variability reflected differences in hybrid selection, nitrogen input, irrigation management, and their interactions. No single management factor alone explained yield outcomes, emphasizing the importance of integrated decision making. To better understand the differences between yield, grain yield was compared with hybrid selection, seasonal cumulative irrigation and nitrogen applications.

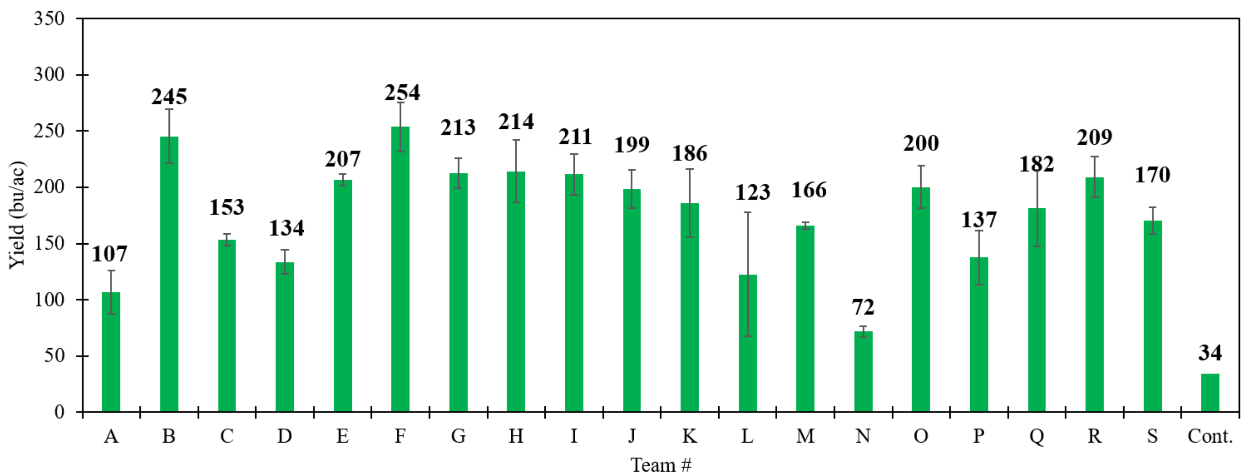

Figure 28. Average crop yield of individual teams in 2025 Corn STEP contest.

<u>Yield response to Hybrid selection</u>

Hybrid choice contributed meaningfully to yield differences in 2025 (Figure 29). Average yield by hybrid ranged from 164 to 254 bu/ac. Pioneer 1511 ($400 MSRP) produced the highest average yield (254 bu/ac), followed by Integra 6915 VT2P ($338 MSRP; 245 bu/ac). Intermediate yields were observed for Agrigold 644-64VT ($386 MSRP; 214 bu/ac) and P1622VYHR ($395 MSRP; 207 bu/ac). The lowest average yields were recorded for Agretech 815AVIP ($260 MSRP; 170 bu/ac) and P2042VYHR ($372 MSRP; 164 bu/ac) (Figure 29). While hybrid selection provided a clear performance signal, the spread in yields across the contest indicates that final outcomes still depended on how well each hybrid's yield potential was supported by irrigation, fertility, and in-season execution

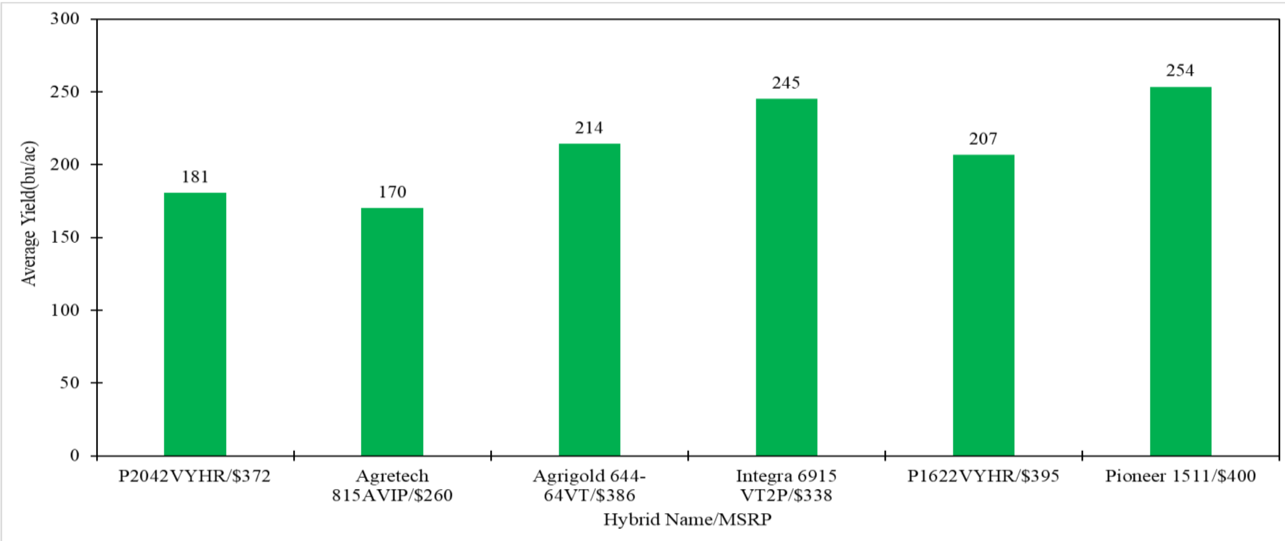

Figure 29. Grain yield response to hybrid in 2025 Corn STEP contest.

<u>Yield response to total fertilizer (N management)</u>

Grain yield showed a moderate relationship with total fertilizer applied (Figure 30; $R^2 = 0.50$), indicating that fertilizer strategy explained about half of the observed yield variability. In general, teams with lower total fertilizer tended to have below-average yields, while many teams with fertilizer totals near or above the contest average (~253 lb/ac) achieved yields near or above the contest average (178 bu/ac). However, higher fertilizer rates did not guarantee the highest yield; teams applying ≥300 lb/ac still produced a wide range of yields, reinforcing that timing, placement, and coordination with irrigation/rainfall are critical for converting fertilizer inputs into grain yield.

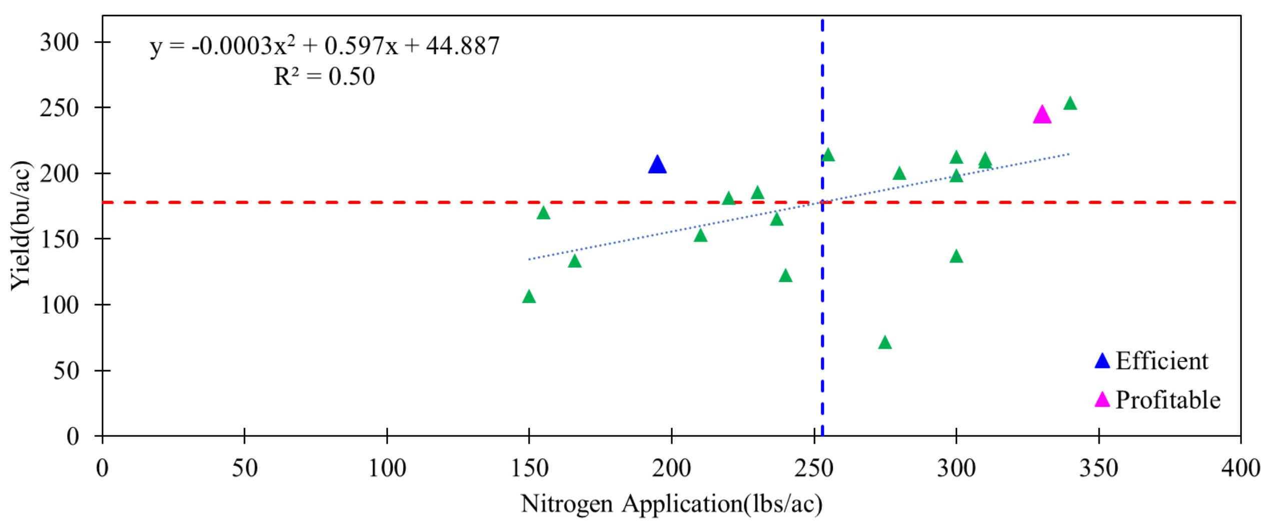

Figure 30. Corn yield (bu/ac) response to season total nitrogen application (lbs/ac). The most efficient and most profitable are indicated by blue and pink markers.

In general, teams with lower total fertilizer tended to have below-average yields, while many teams with fertilizer totals near or above the contest average (~253 lb/ac) achieved yields near or above the contest average (178 bu/ac). However, higher fertilizer rates did not guarantee the highest yield; teams applying ≥300 lb/ac still produced a wide range of yields, reinforcing that timing, placement, and coordination with irrigation/rainfall are critical for converting fertilizer inputs into grain yield. In Figure 30, the blue marker (most input-use efficient) corresponds to a team achieving strong yield at a comparatively moderate fertilizer level (i.e., Team E: 207 bu/ac at 195 lb/ac), while the pink marker (most profitable) corresponds to a team combining high yield with a higher fertilizer input (e.g., Team B: 245 bu/ac at 330 lb/ac). These findings are consistent with observations from previous STEP seasons.

<u>Irrigation Application and Yield</u>

Yield was more strongly associated with irrigation than fertilizer in 2025 (Figure 31; $R^2 = 0.7241$), indicating irrigation management was a major driver of yield differences among teams. Yields generally increased as irrigation increased from low to moderate levels, with diminishing returns at higher irrigation totals. Importantly, variability remained even at similar irrigation levels; several teams applied roughly 7–11 inches yet achieved very different yields—highlighting that irrigation effects are influenced by hybrid choice, nutrient strategy, rainfall/leaching events, and in-season adjustments. In Figure 31, the most profitable team (pink marker) aligns with a mid-to-upper irrigation level combined with high yield (e.g., Team B: 10.0 in; 245 bu/ac). The most efficient team (blue marker) aligns with strong yield at relatively moderate irrigation (e.g., Team E: 8.75 in; 207 bu/ac), illustrating that competitive performance can be achieved without maximizing irrigation.

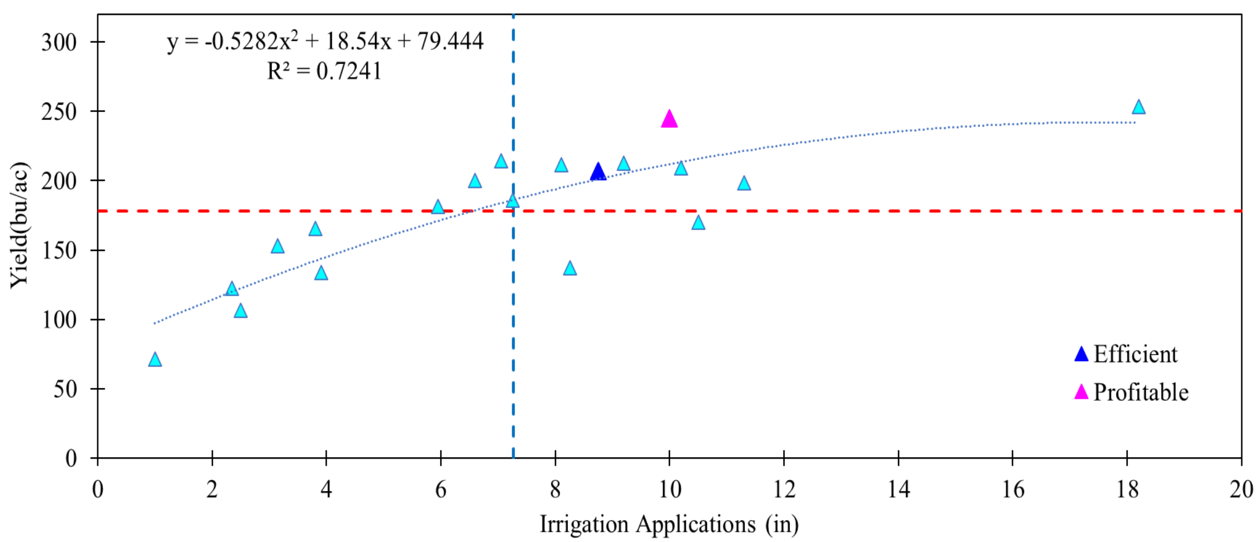

Figure 31. Corn yield (bu/ac) response to season total irrigation application (inches). The most efficient and most profitable are indicated by blue and pink markers.

Input-Use Efficiency (WNIPI)

To complement yield-based comparisons, team performance was evaluated using the WNIPI index, which reflects overall input–output performance (Figure 32). In 2025, WNIPI ranged from 0.075 to 0.332, showing wide differences in how effectively teams converted management decisions into outcomes. Team E led the contest (0.332), followed by Team S (0.302), Team H (0.290), and Team Q (0.285), with a second tier including Teams C (0.273), D (0.272), K (0.267), and M (0.261). Most teams clustered between 0.19 and 0.25, while Team N (0.075) and Team P (0.137) recorded the lowest values. When WNIPI was plotted against yield (Figure 33), the relationship was positive but weak ($R^2 = 0.1552$), confirming that WNIPI is not a yield predictor, but a measure of how well yield (and performance) is achieved relative to inputs.

Several teams stood out for combining high yield with strong WNIPI(Table 4). Team E delivered the best overall balance, producing 207 bu/ac with the highest WNIPI (0.332) while using 7.25 in irrigation and 230 lb/ac total fertilizer. Team H achieved a similar balance (214 bu/ac, WNIPI 0.290) with 9.2 in irrigation and 300 lb/ac fertilizer. In contrast, Team B produced the second-highest yield (245 bu/ac) but with a mid-range WNIPI (0.239) and comparatively higher inputs (10.0 in irrigation; 330 lb/ac fertilizer), suggesting yield gains came with greater input intensity. Likewise, Team F achieved the highest yield (254 bu/ac) but had a lower WNIPI (0.186), indicating that maximum yield did not necessarily translate from efficiency. Overall, these results reinforce that 2025 outcomes were driven by optimized management packages, not simply maximizing irrigation or fertilizer.

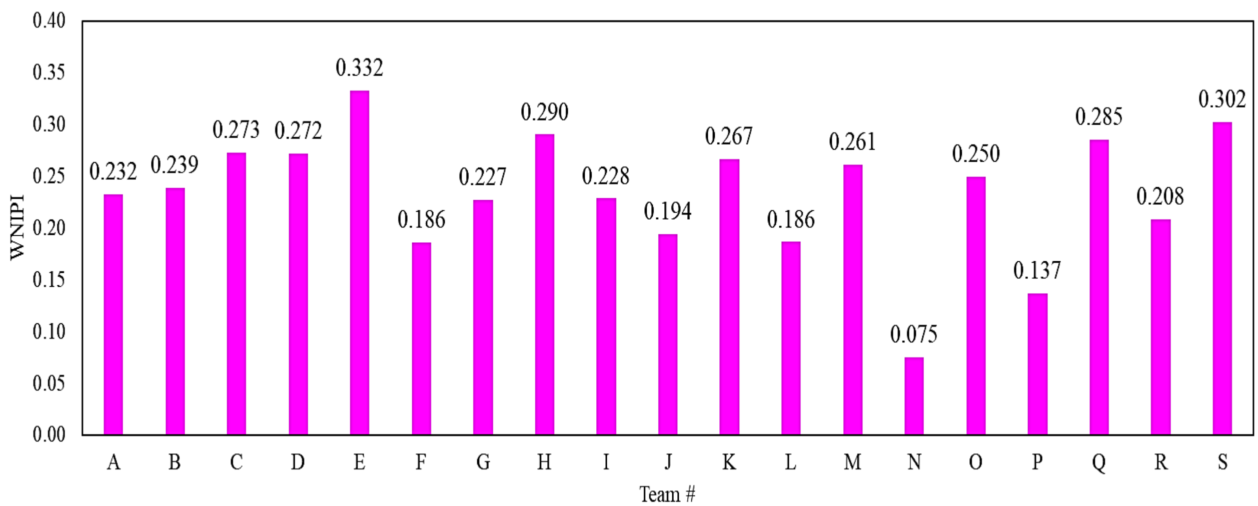

Figure 32. Water–N input performance index (WNIPI) of individual teams in the 2025 Corn STEP contest.

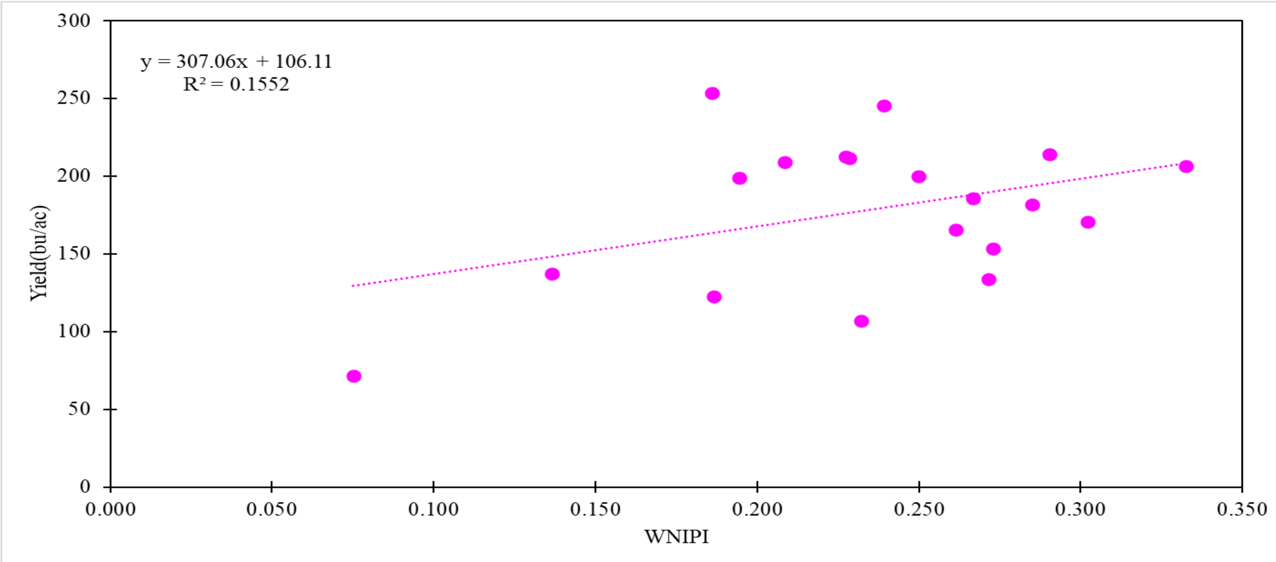

Figure 33. Relationship between grain yield (bu/ac) and WNIPI across teams in the 2025 Corn STEP contest.

Table 4. Cumulative season irrigation, nitrogen application, yield, and Water Nitrogen Intensification Performance Index (WNIPI) for different teams.

Team number	Cumulative Irrigation(in)	Total Fertilizer	Yield	WNIPI
A	2.5	150	107	0.232
B	10	330	245	0.239
C	3.15	210	153	0.273
D	3.9	166	134	0.272
E	8.75	195	207	0.332
F	18.2	340	254	0.186
G	9.2	300	213	0.227
H	7.05	255	214	0.290
I	8.1	310	211	0.228
J	11.3	300	199	0.194
K	7.25	230	186	0.267
L	2.35	240	123	0.186
M	3.8	237	166	0.261
N	1	275	72	0.075
O	6.6	280	200	0.250
P	8.25	300	137	0.137
Q	5.95	220	182	0.285
R	10.2	310	209	0.208
S	10.5	155	170	0.302

Profitability

Each team's gross profit was calculated by subtracting the total fixed production cost per acre and STEP variable cost per acre from corn sales revenue per acre. Gross profit does not account for the general and administrative costs of running a farm business. Each team's revenue per acre was calculated by multiplying yield per acre by the average farm-gate price for each team. The average farm-gate price is the weighted average delivered price minus a $0.30 per bushel hauling charge to deliver the corn to the local buying point**.** Figure 34 presents the contribution margin per acre (green bars) and gross profit per acre (blue bars) for each team. Contribution margin is revenue minus STEP variable costs. It does not account for fixed production costs that are the same for each team. Gross profit accounts for both STEP variable costs and fixed production costs. All teams had a positive contribution margin but a negative gross profit in 2025.Considerable variation in both revenue and costs is evident among teams, reflecting differences in yield, marketing outcomes, and input management strategies. For example, Team Rootin Tutens (B) recorded the highest (least negative) gross profit at –$83/acre, supported by a high yield of 245 bu/ac and moderate production costs. Team Riverbend (H) had the second highest gross profit (-$97/acre), supported by an above-average yield, an above-average price, and about average production costs. In contrast, teams with the lowest profit were hurt by poor yields or in some cases moderate yields with high production costs. Overall, the figure highlights that profitability in the STEP contest was shaped not only by yield performance but also by the efficiency of input-use and marketing decisions.

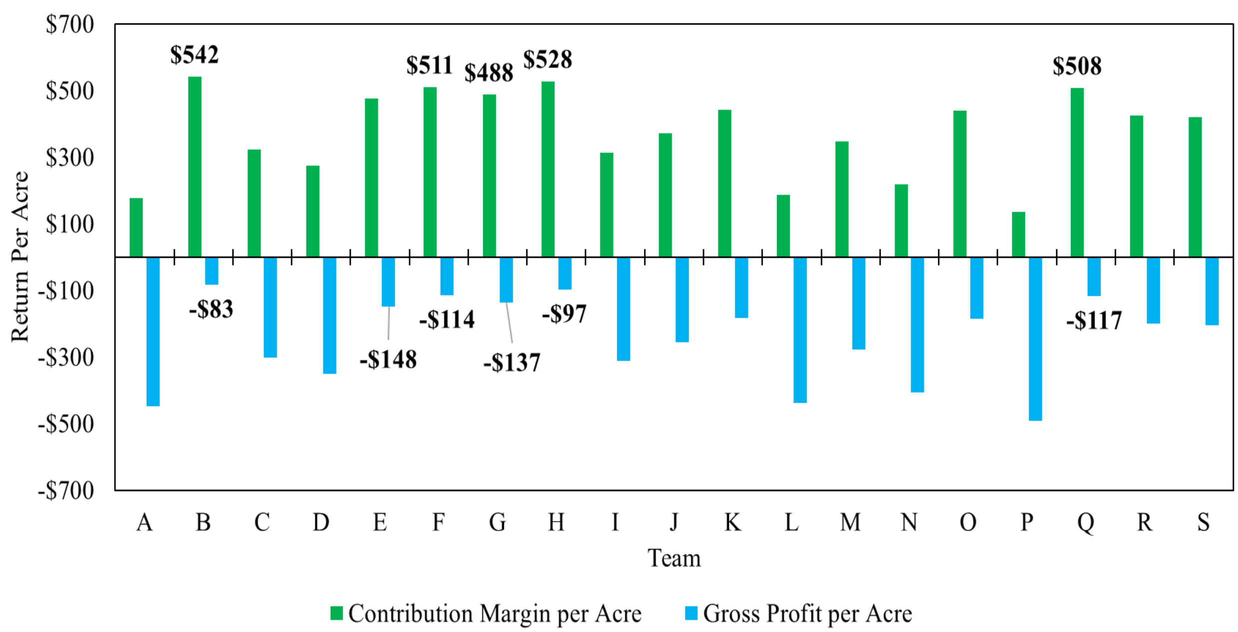

Figure 34. Gross profit per acre calculated for each team's corn program along with Contribution margin per acre

2025 STEP Winners Information

Top 5 Winners of the 2025 Corn STEP Contest:

Under the revised unified award framework, the Top 5 teams of the 2025 Corn STEP Contest were recognized based on their overall composite performance, integrating both economic profitability and input-use efficiency.

1st Place – Team Quincy (Overall Winner)

Team Quincy emerged as the overall winner of the 2025 Corn STEP Contest, demonstrating a strong balance between productivity, efficiency, and profitability (Figure 28). They planted Pioneer P1622VYHR at 32,000 seeds per acre and applied a total of 195 lbs N/ac, consisting of 30 lbs/ac as starter fertilizer, 96 lbs/ac broadcast, 24 lbs/ac banded, and 45 lbs/ac liquid side-dressed. The team applied 8.75 inches of irrigation in 28 events, averaging 0.31 inches per event, and selected Yield Protection insurance at 50% coverage. Their average farm-gate price was $4.48/bu, resulting in a yield of 207 bu/ac, a WNIPI of 0.332, and a gross profit of –$148/ac. Their strong performance across yield, efficiency, and profitability positioned them as the most well-rounded team of 2025(Figure 35).

Figure 35. Team Quincey first place holder in 2025 Corn STEP receiving a check of $2000 from Mr. Stanley Posey, Nutrien and Dr. Greg Kiker, Dean UF/IFAS.

2nd Place – Team Riverbend (Runner-up)

Team Riverbend secured second place with a high-performing and consistent management strategy. They planted Agrigold 644-64VT at 32,000 seeds per acre and applied 255 lbs N/ac, including 30 lbs/ac as starter fertilizer and 225 lbs/ac of CRF (Pursell). Their total irrigation was

7.05 inches over 27 events, averaging 0.26 inches per event, and they selected Yield Protection insurance at 50% coverage. With an average farm-gate price of $4.68/bu, they achieved a yield of 214 bu/ac, a WNIPI of 0.290, and a gross profit of –$97/ac, reflecting strong efficiency and relatively better profitability compared to many competitors (Figure 36).

Figure 36. Team Riverbend Farms (Team members: Kyle Kelley, Tera Kelley, and Ed White) are second place holder in 2025 Corn STEP, receiving a check of $1500 from Mr. Stanley Posey, Nutrien and Dr. Greg Kiker, Dean UF/IFAS.

<u>3rd Place – PS Farms</u>

Team PS Farms earned third place by effectively managing inputs while maintaining competitive yield. They planted Agritech 815AVIP at 32,000 seeds per acre and applied a total of 155 lbs N/ac, including 30 lbs/ac starter, 75 lbs/ac banded, and 50 lbs/ac liquid side-dressed. Their irrigation totaled 10.5 inches over 26 events (average 0.40 inches per event), and they selected Yield Protection insurance at 60% coverage. With an average farm-gate price of $4.51/bu, the team produced 170 bu/ac, achieved a WNIPI of 0.302, and recorded a gross profit of –$205/ac, illustrating strong input-use efficiency despite a moderate yield level (Figure 37).

Figure 37. Team P S Farms (Team members: Philip Smith) are third place holders in 2025 Corn STEP, receiving a check of $1250 from Mr. Stanley Posey, Nutrien and Dr. Greg Kiker, Dean UF/IFAS.

4th Place – Team Rootin Tutens

Team Rootin Tutens secured fourth place in the 2025 Corn STEP Contest, delivering one of the highest yields of the competition while maintaining competitive overall system performance. The team planted Integra 6915 VT2P at 32,000 seeds per acre and implemented an intensive nitrogen management strategy, applying a total of 330 lbs N/ac. This included 30 lbs/ac as starter fertilizer, 30 lbs/ac contributed through a leaching rain event, and 270 lbs/ac of controlled-release fertilizer (CRF; Pursell). Irrigation management consisted of a total application of 10 inches distributed across 20 irrigation events, with an average application rate of 0.50 inches per event. The team selected Yield Protection insurance at 50% coverage and marketed their grain at an average farm-gate price of $4.48/bu (Figure 38).

This management approach resulted in a high grain yield of 245 bu/ac, one of the top yields achieved in the contest. Team Rootin Tutens recorded a WNIPI of 0.239, reflecting moderate input-use efficiency given the relatively high fertilizer and irrigation inputs, and a gross profit of –$83/ac, which ranked as the best profit (smallest loss) in 2025. Overall, their performance highlights how achieving a high yield relative to production costs is positively associated with both profitability and efficiency.

Figure 38. Team Rootin Tutens (Team members: Travis Tuten and Titus Tuten) are third place holder in 2025 Corn STEP, receiving a check of $1250 from Mr. Stanley Posey, Nutrien and Dr. Greg Kiker, Dean UF/IFAS.

5th Place – Team Rocking D Squared

Team Rocking D Squared finished in fifth place, demonstrating a well-structured and consistent management approach. They planted P2042YHR at 32,000 seeds per acre and applied 230 lbs N/ac, consisting of 30 lbs/ac starter fertilizer and 200 lbs/ac of CRF (Pursell). Their total irrigation was 7.25 inches over 16 events, averaging 0.45 inches per event. They selected Revenue Protection insurance at 85% coverage and marketed their grain at an average farm-gate price of $4.48/bu. The team achieved a yield of 186 bu/ac, a WNIPI of 0.267, and a gross profit of –$183/ac, reflecting a solid combination of profit and efficiency (Figure 39).

Figure 39. Team Rocking D Squared (Team members: Kevin Dasher and Erin Dasher) are fifth place holders in 2025 Corn STEP, receiving a check of $750 from Mr. Dr. Eric Simonne from UF-IFAS, Nutrien and Dr. Kevin Athearn, RSA, NFREC, Live Oak.

Conclusions

The 2025 Florida STEP competition successfully demonstrated continued progress toward improved irrigation and nutrient management efficiency while maintaining economic viability. Results confirm that data-driven, balanced management strategies can enhance sustainability without compromising productivity. Outcomes from the 2025 season will inform future STEP competitions, extension programming, and stakeholder engagement activities, supporting FDACS objectives for water-quality protection and water-resource conservation. Key findings from the 2025 STEP competition are listed below:

- Yield: Seasonal grain yield ranged from 72 to 254 bu/ac across teams.
- Irrigation: Total irrigation applied ranged from 1.0 to 18.2 inches.
- Nitrogen/fertilizer: Total nitrogen application ranged from 150 to 381 lb N/ac.

- Hybrid performance: Average yield by hybrid ranged from 164 to 254 bu/ac; the highest average yield was observed for Pioneer 1511 (254 bu/ac), followed by Integra 6915 VT2P (245 bu/ac).
- Marketing environment: Teams' average forward contract prices ranged approximately from \$4.70 to \$5.28/bu, while the harvest-week spot price used for uncontracted grain was about \$4.78/bu.
- Input-use efficiency (WNIPI): WNIPI ranged from 0.075 to 0.332, indicating wide differences in how effectively teams converted water and nitrogen inputs into yield relative to the control framework.
- The 2025 awards recognized five overall winners (Top 5) under the composite ranking framework: Team Quincy (1st), Team Riverbend (2nd), PS Farms (3rd), Team Rootin Tutens (4th), and Team Rocking D Squared (5th) (Figure 40).
- Across the Top 5 winners, grain yield ranged from 170 to 245 bu/ac, demonstrating multiple successful pathways to competitive performance.
- Across the Top 5 winners, total nitrogen applications ranged from 155 to 330 lbs N/ac, highlighting that strong performance was achieved under both moderate-N and higher-N programs depending on the full management package.
- Across the Top 5 winners, total irrigation ranged from 7.05 to 10.5 inches, applied through 16 to 28 events, reinforcing that irrigation strategy (frequency and total depth) was an important contributor but not the only driver of success.
- The Top 5 winners represented a range of risk-management decisions, including both Yield Protection (50–60% coverage) and Revenue Protection (85% coverage).
- The Top 5 winners also differed in marketing outcomes, with average farm-gate prices ranging from \$4.48/bu to \$4.68/bu, indicating that marketing and pricing contributed to overall ranking alongside agronomic performance.

Figure 40. Congratulations to the 2025 Corn STEP winners

Acknowledgements

The successful completion of the 2025 STEP competition was made possible through the commitment and participation of growers, industry partners, UF/IFAS faculty and staff, and supporting agencies. Funding support was provided by the Florida Department of Agriculture and Consumer Services (FDACS). The project team also acknowledges the support of NFREC-SV farm staff and UF/IFAS Extension personnel for their assistance throughout the season.