

Premier Cotton Education North Region Evaluation Results

Educational program focus areas

- Weed Management
- Variety Selection & Pre-plant Decisions
- Disease & Nematode Management
- Harvest Preparation & Technologies
- Soil & Water Relationships
- Marketing & Economic Risk Management
- Fertility
- Insect Management

The Premier Cotton educational program was established to:

- ✓ Identify key program areas that address producer needs in cotton
- ✓ Provide teaching objectives within each program area
- ✓ Establish evaluation instruments to determine the Extension educational impact of these programs
- ✓ Provide educational deliveries to impact decisions and economic return of cotton producers



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Weed Management 2014-2018

Resistance of Palmer Amaranth or pigweed is a primary concern for producers on the High Plains of Texas along with a growing number of other species of weeds. Texas A&M AgriLife Extension programs focus on weed recognition, resistance understanding, control and management strategies, herbicide selection and use, drift issues, and new technologies. An effort towards the handling and safe use of these pesticides is also a priority.



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Producers return on information estimations:
(5-year total)

\$12.08 per acre
\$32.9 Million

Auxin certification trainings focused on the handling and safe use of pesticides and reduces the incidence of drift, exposure, and use of products.
AgriLife reached over 8,000 producers in 2018.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **82.7%** (1194 of 1443) indicate they intend to **identify and manage herbicide resistant weeds** based on best management practices Texas A&M AgriLife Extension recommends
- **84.3%** (965 of 1145) indicate they intend to **utilize yellow herbicides and other herbicides** with different modes of action to aid in management of resistant weeds
- **83.7%** (1241 of 1482) indicate they intended to **manage weeds** based on Texas A&M AgriLife Extension recommendations
- **79.8%** (861 of 1078) indicate they intend to **determine the most common/troublesome weed species and chemical/non-chemical strategies** available based on Texas A&M AgriLife Extension recommendations

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
New technologies in weed management	692	2.51	3.40	29.5%
Factors in weed management systems and herbicide selection	1725	2.62	3.44	27.2%
Weed resistance and management strategies for prevention	1942	2.69	3.46	25.7%
Management strategies to control resistant weeds	1952	2.63	3.47	27.9%
Value and usefulness of replicated research trials at the county, district, and regional levels	1383	2.61	3.35	24.7%
Importance of weed identification	1443	2.82	3.47	21.6%
Factors affecting herbicide drift and management	1659	2.85	3.48	21.0%

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Varieties & Pre-plant Decisions 2014-2018

Texas A&M AgriLife Extension cotton educational programs emphasized variety selection, seed quality and testing, emergence issues, performance in varying environments, seeding rates and depths, growth and development, variety traits influence on pest control, seed quality, economics, etc.



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Producers return on information estimations:
(5-year total)

\$10.22 per acre

\$16.7 Million

Development of varieties that genetically reduce pest pressure means fewer in-season applications. Less pesticide use decreases the incidence of exposure to humans and the environment.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **73.4%** (202 of 275) indicate they more rapidly *adopt herbicide-resistant technology* based on Texas A&M AgriLife recommendations
- **74.1%** (668 of 901) indicate they more rapidly *adopt new cotton varieties* based on Texas A&M AgriLife recommendations
- **72.0%** (322 of 447) indicate they more rapidly *adopt Bt cotton insect-resistant technology* based on Texas A&M AgriLife recommendations

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
Value and limitations of transgenic varieties	377	2.41	3.29	28.3%
What varieties yield well under various irrigation and dryland production systems	917	2.64	3.30	22.0%
Which varieties are potentially more profitable based on yield and quality	911	2.70	3.38	22.7%
The necessity of a varieties "complete package" to reduce production risks	577	2.43	3.36	30.9%
Which varieties have good fiber quality	508	2.70	3.34	31.1%
Why variety selection is important	946	2.89	3.53	21.3%
Value and usefulness of replicated research trials at the local, district, and regional level	456	2.72	3.44	23.9%
Why is seed quality important and how to determine quality	423	2.80	3.45	21.7%
Why seedling rates are important	144	2.90	3.67	25.6%
Cotton growth stage and development	259	2.64	3.38	24.6%
Seed treatments	159	2.30	3.02	24.0%

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Disease/Nematodes 2014-2018

Disease/Nematode management in cotton continues to be an important issue to producers on the High Plains of Texas. Texas A&M AgriLife Extension educational programs focused on recognition and diagnosis, cultural/management strategies, varietal importance, rotational influence, and pathogen biological and environmental interaction.



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Producers return on information estimations:
(5-year total)

\$11.54 per acre

\$15.5 Million

Development/Identification of resistant varieties, diagnosis, and cultural practices reduce chemicals being used as control measures.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **76.1%** (511 of 671) indicate they intend to use Texas A&M AgriLife *management guidelines for diseases and root knot nematodes*
- **75.7%** (729 of 963) indicate they intend to use Texas A&M AgriLife *cotton variety trials and disease ratings* when considering which varieties to plant
- **59.9%** (286 of 477) indicate they intended to use *soil sampling for nematodes to determine variety selection* in problem fields

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
Varietal influence on cotton disease/nematodes	780	2.58	3.40	30.4%
Importance of proper disease/nematode diagnosis	724	2.56	3.47	28.5%
Disease/Nematode management strategies and options	1049	2.45	3.35	30.1%
How to identify nematode/specific disease symptoms	607	2.47	3.37	29.9%
Relationship between cultural and disease development	387	2.48	3.32	27.9%
Impact of pathogen biology and environmental interaction on disease development	463	2.39	3.15	25.5%
Value and usefulness of replicated research trials at the local, district, and regional levels	364	2.65	3.36	23.8%
Crop rotational influence on disease occurrence	664	2.80	3.48	22.6%

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Harvest Preparation & Technologies 2014-2018

Texas A&M AgriLife Extension cotton educational programs emphasized the safe use of harvest aid products, decisions based on environment and maturity, new harvest technologies, quality issues, and management decisions.



Producers return on information estimations:
(5-year total)

\$12.49 per acre
\$2,238,275

Chemicals used to prepare the crop for timely harvest and efficiently harvesting a mature crop takes timely decision making. Opportunities to harvest early means better quality and more return.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **86.0%** (86 of 100) indicate they would use *harvest aid products based on the cotton harvest aid guide* and local AgriLife Extension recommendations
- **89.3%** (42 of 47) indicate they would *determine rates based on cotton harvest aid trials* conducted by Texas A&M AgriLife Extension
- **84.9%** (45 of 53) indicate they would *time harvest aide applications based on crop maturity* as defined by Texas A&M AgriLife information
- **68.2%** (15 of 22) indicate they would use *harvesting method comparisons to decide change in harvest equipment* as recommended

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
Environmental conditions that influence harvest aid performance	77	2.29	3.28	32.9%
Why harvest aid selection is important	99	2.97	3.33	11.9%
Which harvest aids are potentially more profitable	95	2.60	3.48	29.2%
Need for appropriate crop conditions and maturity level for optimum harvest aid performance	41	2.29	3.32	22.3%
How to properly gauge crop maturity for optimum harvest aid performance	85	2.31	3.42	36.0%
Value and limitations of harvest aid chemical use	45	2.61	3.90	36.1%
Non-target safety issues associated with some harvest aid chemicals	37	2.29	3.63	44.5%

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Soil & Water Relationships 2014-2018

Soil and Water relationships continue to be an important issue to producers on the High Plains of Texas. Texas A&M AgriLife Extension irrigation educational programs focused on improved efficiency and new technologies, water management, economics of irrigation, irrigating to crop needs, and soil types and differences in relation to holding capacities, etc.



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Producers return on information estimations:
(5-year total)

\$5.14 per acre
\$2,112,909

Efficient use and conservation of water resources is a priority for everyone. Education is focused on reducing water use while maintaining economic returns.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **72.7%** (96 of 132) indicate they would make *irrigation management decisions based on crop water use profiles and knowledge of soil moisture*
- **71.7%** (117 of 163) indicate they would make *irrigation decisions based on economic return rather than higher yield potential*
- **78.8%** (78 of 99) indicate they would apply *irrigation water more strategically for early, mid and late stages of irrigation based on crop needs*
- **66.1%** (45 of 68) indicate they would *utilize soil moisture monitoring tools and technologies* throughout the growing season
- **78.8%** (78 of 99) indicate they would *manage and maintain irrigation systems for optimal performance and high-efficiency water application*

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
Irrigation technologies and BMP to improve water use efficiency	185	2.56	3.24	22.9%
Soil and water relationships	189	2.62	3.21	19.8%
Soil moisture management tools and techniques	132	2.54	3.23	22.8%
Crop water requirements	97	2.54	3.10	18.7%
Irrigation efficiencies and technologies	49	2.76	3.32	19.8%
Water needs based on crop growth stage and development	45	2.75	3.49	24.6%
Tillage systems and rotations to manage soil water	160	2.69	3.29	19.9%
Soil and water conservation strategies	48	2.77	3.19	14.0%
Water quality impacts on production	22	2.84	3.36	17.3%

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Marketing & Risk Management 2014-2018

Economic Risk Management and Marketing programming has focused on education and decision making related to farm bill and management. Emphasis is in marketing, cost of production, budget, analysis, identifying risk, farm Assistance and technical tools available.



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Producers return on information estimations:
(5-year total)

\$12.90 per acre
\$4,318,909

42 North Region Counties were involved in 101 farm bill educational programs preparing producers for decisions related to their farms. One on one assistance with over 350 producers and 1400 farms.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **74.5%** (870 of 1242) indicate they anticipate **benefiting economically from the farm bill training and decision aids**
- **69.0%** (161 of 233) indicate they intended to **develop a personalized cotton budget** with breakeven cost of production
- **62.7%** (74 of 118) indicate they intend to **participate in farm assistance programs** to determine production levels/requirements/systems
- **68.8%** (168 of 244) indicate they would utilize **price risk management tools** (options, futures, insurance)
- **60.0%** (81 of 135) indicate they would **develop a written marketing plan**
- **67.0%** (61 of 91) indicate they would **utilize insurance decision tools** developed by AgriLife Extension
- **85.4%** (1088 of 1274) indicate they would utilize **AgriLife decision tools to make informed decisions regarding risk and farm bill**

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
How to incorporate market fundamentals in a marketing plan	220	2.31	3.06	25.0%
Ag Laws and regulations affecting landowners	162	1.82	3.37	51.6%
Knowledge of the new farm bill cotton provisions	1541	1.76	2.93	39.0%
How to incorporate technical analysis in a marketing plan	202	2.32	2.98	22.0%
Importance of knowing cost of production in developing price targets	188	2.83	3.35	17.1%
Benefits of writing a marketing plan	97	2.44	3.11	22.2%
Equipment costs per unit	54	2.45	2.97	17.3%
Incorporating economics into in-season management decisions	99	2.61	3.23	20.0%
Knowledge of marketing alternatives and market projections	158	2.38	3.12	24.8%
How to identify cost of production	97	2.69	3.15	15.4%

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Fertility 2014-2018

Fertility programs in cotton have focused on soil health and nutrient management issues important to cotton farmers in the North Region of Texas. Texas A&M AgriLife Extension programs focused on sampling, identification of deficiencies, deep nutrient availability, economics of fertility, cover crops, organic matter, and chemistry influence. These issues and others impact producers' decisions regarding



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**Producers return on information estimations:
(5-year total)
\$10.59 per acre
\$1,793,890**

Knowing crop needs and nutrient availability, allows producers to efficiently and economically apply needed fertilizer and eliminate possible environmental issues.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program.

- **73.3%** (102 of 139) indicate they would use *proper sampling, testing, and fertilizer recommendations* based on Texas A&M AgriLife Extension recommendations
- **63.2%** (141 of 223) indicate they anticipate *deep sampling fields for residual nitrate* based on Texas A&M AgriLife Extension recommendations
- **56.8%** (58 of 102) indicate they intend to *test water for nitrates and utilize that information to reduce nitrogen fertilizer applications*
- **50.4%** (56 of 111) indicate they intend to *use micronutrients in cotton*
- **51.8%** (28 of 54) indicate they will *increase cover crop use to reduce wind erosion and improve soil health*
- **51.7%** (15 of 29) indicate they would *develop a targeted program based on samples and yield*

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
How to properly sample both surface and subsoil	164	2.70	3.29	19.7%
Potential value of deep soil sampling for residual Nitrate	176	2.44	3.41	32.4%
Interpretation of soil sample results, including critical levels	174	2.71	3.24	17.6%
Value of targeting specific fields for nutrient management	112	2.73	3.29	18.6%
Identification of key nutrient deficiency symptoms	96	2.50	3.20	21.5%
Influence of soil chemistry on growth and development	103	2.59	3.10	18.0%
Effects of pH levels on available nutrients	123	2.56	3.32	21.5%
Potential benefits of cover crops	57	2.52	3.22	16.0%
Organic matters role in soil health	234	2.67	3.32	21.5%
Impact of moisture use by a cover crop on subsequent crop yield	18	2.3	3.31	32.0%
Soil structure affected by cover crops	18	2.54	3.38	28.0%
Soil biology affected by cover crops	18	2.27	3.15	29.3%

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Insect Management 2014-2018

Identification of both damaging and beneficial pests, economic and action thresholds, use of pesticides, new management options for resistance management, technology traits and differences, and life cycle of insects are becoming major educational cotton issues. Learning to scout fields and make decisions has become a lost art and emphasis is being placed on these skills to make economical decisions.



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Producers return on information estimations:
(5-year total)

\$5.89 per acre
\$2,462,679

Resistant insects and reduced effectiveness of technology has increased the research focus on alternatives and brought back the need to scout and identify problems in the field.

Adoption & Behavior Changes

Eligible producers indicated their intentions to adopt practices or change behavior based on this program

- **84.4%** (174 of 206) indicate they would utilize *economic thresholds* established by Texas A&M AgriLife recommendations
- **83.4%** (242 of 290) indicate they will *scout insects* based on Texas A&M AgriLife recommendations
- **79.9%** (349 of 437) indicate they will *select insecticides and/or utilize other management practices* based on Texas A&M AgriLife recommendations
- **78.9%** (15 of 19) indicate they will *utilize Bt cotton varieties to aid in insect management, while limiting the use of insecticides*
- **81.2%** (26 of 32) indicate they would consider the use of *new Bollworm management options*
- **79.5%** (78 of 98) indicate an understanding of the negative *impact of some insecticide applications on beneficial insects/arthropods*

Producers were asked to select their level of understanding **BEFORE** and **AFTER** each program to determine knowledge gained for each topic addressed.

Knowledge Gained	# of Producers	Before	After	% of Change
Bt management traits relate to resistance	157	2.39	3.26	29.0%
Accurate identification of insect pests and their damage	254	2.30	3.43	37.5%
Importance of action thresholds and economics	420	2.52	3.33	27.0%
Proper sampling techniques for pests	203	2.12	3.20	35.9%
When and under what conditions to use insecticides	244	2.35	3.36	33.6%
Identification and understanding of importance of beneficial insects	132	24.49	3.46	32.3%
New Bollworm management options	51	2.34	3.14	26.5%
Pest risks for non-Bt cotton varieties	25	2.57	3.35	26.0%
Life cycle of insects and understanding of control	100	2.09	3.33	41.3%
Which insecticides are effective	155	2.21	3.45	41.2%
Impact of insecticides on beneficial insects/arthropods	21	2.20	3.07	29.0%