A Profitability Analysis of Hybrid Pima and Upland Cotton Varieties in Northeast Texas

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A PROFITABILITY ANALYSIS OF HYBRID PIMA AND UPLAND COTTON VARIETIES IN NORTHEAST TEXAS

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ABSTRACT

Seven cotton cultivars were evaluated for yield, fiber quality, and returns in replicated small plot trials (n = 106) in Fairlie, Texas in 2020-2023. Lint yield and profit are analyzed using ANOVA and Tukey test. Profit scenarios are considered at various yield and price levels. Cotton lint yield averaged 472.83 pounds per acre for upland and 390.96 for hybrid Pima. Loan values averaged 50.81 c/lb for upland and 54.18 c/lb for hybrid Pima. Profits are estimated at -$281.23/acre for upland and at -$371.66/acre for hybrid Pima.

Keywords: Cotton, Pima, Profit, Upland, Yield

Introduction

Cotton is one of the most prevalent cash crops in the world, with approximately 32.3 million hectares used in commercial production globally (USDA-PSD, n.d.). According to the United States Department of Agriculture (USDA), cotton accounts for an estimated 25% of world fiber use (Meyer and Dew, 2025). Due to its versatility, performance, and comfort, cotton is used for a variety of domestic and industrial applications and is an integral component of rural economies (National Cotton Council, 2024). Cotton fiber is most prominently utilized in the manufacture of textiles and home furnishings such as bath towels and window shades and cottonseed is an important feed-additive for livestock (National Cotton Council, 2024).

Given the vital role cotton plays in local and international economies, a robust and flourishing global market has developed. From the years 2013-2023, world cotton production exceeded an average of 100 million pounds each year. Approximately 78 countries generate a minimum of 480,000 pounds annually; however, 64% of production can be attributed to the top three cotton-producing countries, China, India, and the United States (USDA-PSD, n.d.). China and India lead the world in total cotton production, contributing on average approximately 27,000 thousand and 26,000 thousand bales per year, respectively, from 2014-2023 (USDA-PSD, n.d.). These two countries jointly account for 48% of total supply(USDA-PSD, n.d.). By comparison, the United States (U.S.) provides just 14% of world cotton. (USDA-PSD, n.d.). Figure 1 summarizes cotton production by country from 2014-2023.

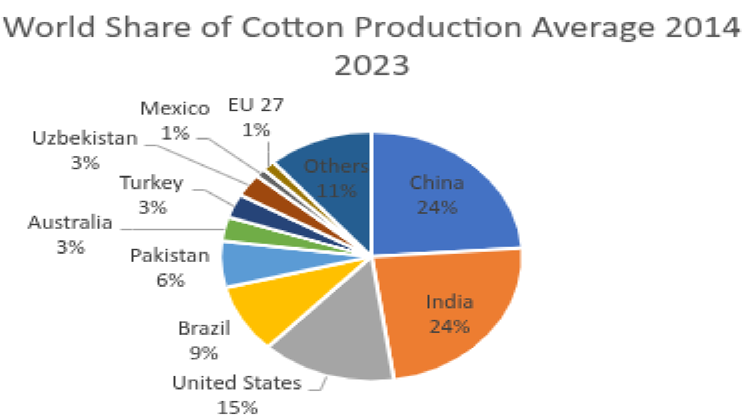

Figure 1. World Share of Cotton Production Average 2014-2023

Source: USDA-PSD (n.d.)

While the U.S. trails China and India in total cotton production by nearly half their annual yield, the U.S. is the world's largest exporter of this commodity, allocating 84% of national production to exports and accounting for 34% of world total (USDA-PSD, n.d.). The primary international markets for U.S. grown cotton are China, Vietnam, Turkey, Pakistan and Mexico (Rosson et al., 2011). For generations, Texas has been an integral component of the U.S. cotton industry. With nearly six million acres in production and producing over 27 billion bales, this state alone generates approximately 40% of national production and generates an estimated $24 billion in revenue from raw cotton and other related industries (Yang et al., 2019). The U.S. cotton industry generates over $50 billion dollars in annual revenue and provides over 191,000 jobs (Yang et al., 2019). U.S. textile manufactures alone use an estimated 7.6 million bales of cotton annually (National Cotton Council, 2024). Figure 2 reports cotton harvested acres by region in 2021, while Figure 3 reports cotton production (million bales per year) by the leading states in 2018-2020.

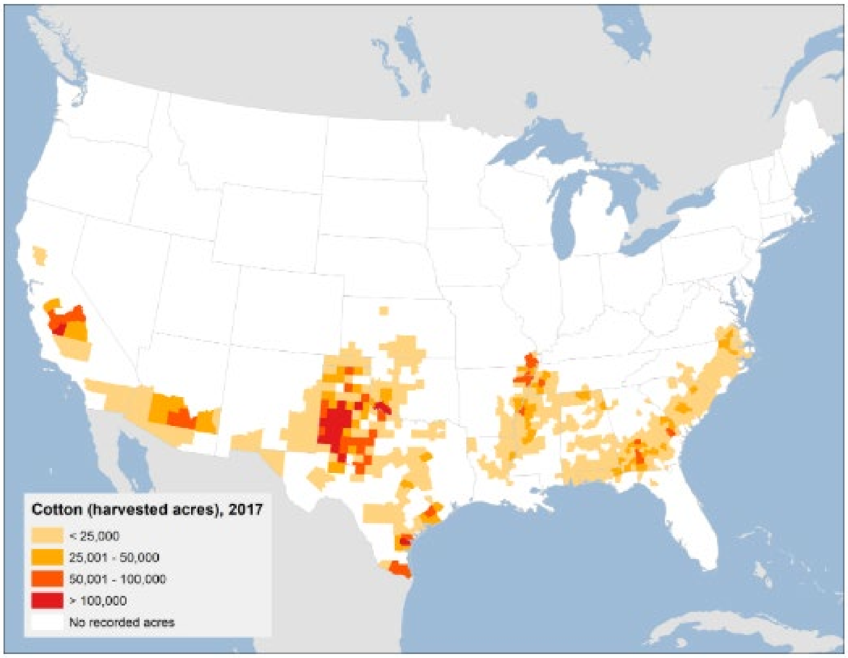

Figure 2. Cotton (harvested acres) by region, 2017

Source: USDA (2025)

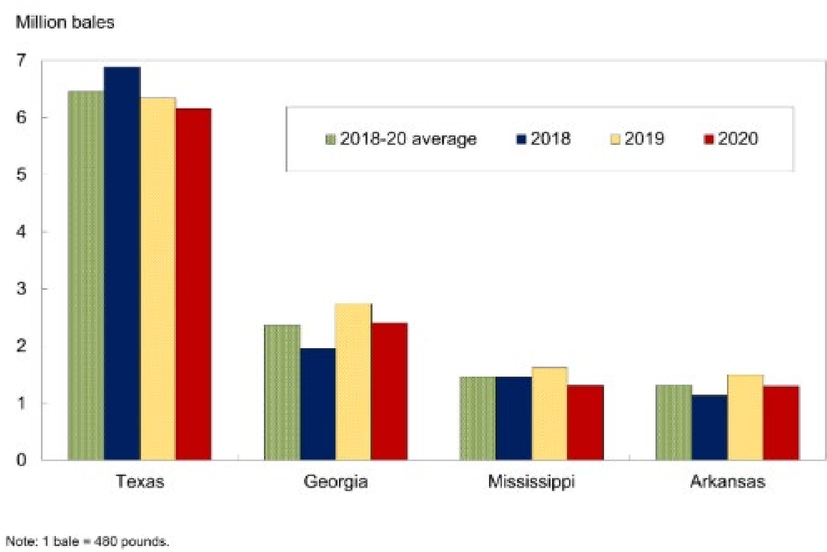

Figure 3. Cotton production (million bales/year) in Texas, Georgia, Mississippi and Arkansas, 2018-2020

Source: USDA (2025)

Currently, this industry is dominated by the production of upland cotton due to the yield and vigor associated with these cultivars. A small but growing portion of the industry is designated to the cultivation of long-staple cotton such as Egyptian, Pima, or Pima hybrids. These cultivars are known for their fiber length, fineness, strength, and subsequent increased value and are prized for their use in the manufacture of luxury cotton materials. Historically, these characteristics made such cultivars the preferred options for U.S. cotton production, but the industry has shifted away from them due to economic considerations (Holladay et al., 2021). *Anthomus grandis,* commonly known as boll weevil, is a species of beetle endemic to North and Central America and is the primary pest of cotton production in these regions. The damage inflicted by insect feeding on developing cotton bolls leads to reduced yield and economic losses. The extended growing season and water requirements of long-staple cotton make it particularly susceptible to devastation from boll weevil infestations (Holladay et al., 2021). Consequently, production has shifted to focus on shorter season upland cultivars and moved west to reduce insect pressure (Holladay et al., 2021). However, technological advancements in pest management, specifically the effectiveness of boll weevil eradication programs, and genetic engineering for insect resistance have created potential for expanding Pima production in the U.S., specifically in the Southeast (Holladay, et al., 2021).

This study evaluates the economic feasibility of growing hybrid Pima cotton in Northeast Texas. This region was once the primary location for Texas cotton production, but economic losses due to the introduction of boll weevil from Mexico in the 1920s shifted cultivation further west (Holladay et al., 2021). However, recent technological advances have created potential for cotton enterprises to return to this region. Given industry trends away from cotton production in this region over time, consideration must be given to the profitability of reestablishing cotton production in this area. One proposed method of increasing returns to producers is through the cultivation of high-value cotton cultivars, such as Pima hybrids; however, this has yet to be evaluated in Texas. The information received from this study provides a basis with which producers may make informed enterprise decisions and cultivar selection.

Data

The study utilizes data on cotton lint yield and loan price for the period 2020-2023 from six upland cultivars (DP 1646, FM 2398, PHY 332, PHY 350, PHY 400 and ST 4990) and a hybrid Pima cotton cultivar (HA 1432). Data was collected by conducting experiments in Fairlie, Texas (33.30725° N, 95.96367° W). Cotton cultivars were seeded in two row plots, 40 feet in length using a randomized complete block design with four replications. Final populations were calculated by counting the number of plants harvested and multiplying by 1000. Lint was deburred by hand, and samples were ginned on a conventional saw gin to determine lint yield and turnout. Replications were assessed by Texas Tech Fiber Lab for quality determination via high-volume instrument (HVI). Seven cultivars of interest were evaluated for lint yield and profitability based on the 2020-2023 growing seasons. Cultivars of interest were DP 1646, FM 2398, Ha 1432, PHY 332, PHY 350, PHY 400 and ST 4990. The cost of inputs, including seed, fertilizer, herbicide, insecticide, chemical defoliant and desiccant, harvesting cost, insurance, and machinery expense were obtained from AgriLife Extension enterprise budgets (Johnson, 2024).

Analysis of Variance

Yield data (lbs/acre) and profitability ($/acre) were evaluated using two-factor analysis of variance (ANOVA) to calculate any statistically significant differences in yield or profits among the seven cultivars utilized in this study. A 5% probability of making a Type II error was selected to assess any differences cultivar selection may have on lint yield and profit.

The following hypotheses were tested for cotton lint yield by cultivar:

H_0: The cotton lint means by cultivar are the same for all cultivars.

H_1: At least one cultivar has a cotton lint yield mean different from the other cultivars.

The following hypotheses were tested for cotton lint yield by year:

H_0: The cotton lint yield means by year are same for all years.

H_1: At least one year has cotton lint yield mean different from the other years.

The following hypotheses were tested for cotton lint profits by cultivar:

H_o: On average, profits by cultivar are the same for all cultivars.

H_1: At least one cultivar, on average, has cotton lint profits different from the other cultivars.

The following hypotheses were tested for cotton lint profits by year:

H_0: On average, profits by year are the same for all years.

H_1: At least one year, on average, has cotton lint profits different from the other years.

Sensitivity Analysis

A sensitivity analysis was conducted in Microsoft® Excel® for Microsoft 365 Microsoft Online (MSO) to evaluate how profitability of cotton enterprises may be affected by changes in pounds of cotton lint produced and market price of cotton lint. Input costs were held constant while price level (ct/lb) and total yield (lbs/acre) varied. This analysis allows producers to make more informed production decisions based on projected returns under varying cotton lint output levels and market conditions.

Results

Overall, for the period 2020-2023, there were statistical differences in cotton lint yield across cultivars as indicated by an *F*-statistic of 3.59 (p-value of 0.0034). Table 3 presents the results from this analysis. Tukey's studentized range test for lint yield across cultivars revealed a statistical difference in cotton lint yield between PHY 350 and ST 4990, as well as PHY 350 and HA 1432 (hybrid Pima) at the 5% significance level. Average lint yield was 472.831 bs/acre for upland cotton and 390.96 lbs/acre for hybrid Pima. Upland variety PHY 350 for period 2020-2023 averaged 548.75 lbs/acre lint yield, compared to 391.99 lbs/acre from ST 4990 and 390.96 lbs/acre from HA 1432. Figure 5 presents a boxplot visual representation of lint yield (lbs/acre) by both year and cultivar, and Figure 6 displays a boxplot visual representation of lint yield (lbs/acre) by cultivar only.

Table 3. Analysis of Variance for Lint Yield (Lbs/Acre) by Cultivar

Comparisons significant at the 0.05% level are indicated by ***				
Cultivar Comparison	Differences between means	Simultaneous 95% confidence Limits		
PHY350-PHY332	32.64	-106.07	171.34	
PHY350-PHY400	58.80	-79.9	197.50	
PHY350-DP1646	87.55	-51.15	226.25	
PHY350-FM2398	119.78	-18.93	258.48	
PHY350-HA1432	157.79	21.27	294.30	***
PHY350-ST4990	156.76	18.06	295.46	***
PHY332-PHY350	-32.64	-171.34	106.07	
PHY332-PHY400	26.16	-112.54	164.87	
PHY332-DP1646	54.92	-83.79	193.62	
PHY332-FM2398	87.14	-51.56	225.87	

PHY332-HA1432	125.15	-11.37	261.67	
PHY332-ST4990	124.12	-14.58	262.82	
PHY400-PHY350	-58.8	-197.50	79.90	
PHY400-PHY332	-26.16	-164.87	112.54	
PHY400-DP1646	28.75	-109.95	167.45	
PHY400-FM2398	60.98	-77.76	199.68	
PHY400-HA1432	98.99	-37.53	235.50	
PHY400-ST4990	97.96	-40.74	236.66	
DP1646-PHY350	-87.55	-226.25	51.15	
DP1646-PHY332	-54.92	-193.62	83.79	
DP1646-PHY400	-28.75	-167.45	109.95	
DP1646-FM2398	32.22	-106.48	170.93	
DP1646-HA1432	70.24	-66.28	206.75	
DP1646-ST4990	69.21	-69.50	207.91	
FM2398-PHY350	-199.78	-258.48	18.93	
FM2398-PHY332	-87.14	-225.84	51.56	
FM2398-PHY400	-60.98	-199.68	77.73	
FM2398-DP1646	-32.22	-170.93	106.48	
FM2398-HA1432	38.01	-98.51	174.53	
FM2398-ST4990	36.98	-101.72	175.68	
ST4990-PHY350	-156.76	-295.46	-18.06	***
ST4990-PHY332	-124.12	-262.82	14.58	
ST4990-PHY400	-97.96	-236.66	40.74	
ST4990-DP1646	-69.21	-207.91	69.50	
ST4990-FM2398	-36.98	-175.68	101.72	
ST4990-HA1432	1.03	-135.49	137.55	
HA1432-PHY350	-125.15	-294.3	-21.27	***
HA1432-PHY332	-157.79	-261.67	11.37	
HA1432-PHY400	-98.99	-235.5	37.53	
HA1432-DP1646	-70.24	-206.27	66.28	
HA1432-FM2398	-38.01	-174.53	98.51	
HA1432-ST2990	-1.03	-137.55	135.49	

There were also statistical differences in cotton lint yield across years, regardless of cultivar, as indicated by an F-statistic of 17.64 (p-value less than 0.0001). Table 4 presents ANOVA results for lint yield (lbs/acre) by year. Cotton lint yield in 2021 and 2023 werestatistically different from 2020 and 2022 at the 5% significance level utilizing Tukey's studentized range (honestly significant difference) test. In 2021, lint yield averaged 560.17 lbs/acre and was statistically higher than 2020 and 2023, each generating 452.82 lbs/acre and 306.92 lbs/acre, respectively. Cotton lint yield averaged 501.19 lbs/acre in 2022 and was not statistically different from 2020 and 2021. The year 2023 had statistically lower lint yields than all other years in this study at the 5% significance level. Cotton lint yield was lower in 2023 due to an exceptionally hot and dry growing season. Figure 7 displays a boxplot visual representation of lint yield (lbs/acre) by year.

Table 4. Analysis of Variance for Lint Yield (Lbs/Acre) by Year

Comparisons significant at the 0.05% level are indicated by ***				
Cultivar Comparison	Differences between means	Simultaneous 95% confidence Limits		
2021 - 2022	58.95	-36.17	154.06	
2021 - 2020	107.33	23.70	190.87	***
2021 - 2023	253.23	159.36	347.10	***
2022 - 2021	-58.95	-154.06	36.17	
2022 - 2020	48.38	-42.57	139.32	
2022 - 2023	194.28	93.76	294.80	***
2020 - 2021	-107.33	-190.87	-23.79	***
2020 - 2022	-48.38	-139.32	42.57	
2020 - 2023	145.90	56.26	235.55	***
2023 - 2021	-253.23	-347.10	-159.36	***
2023 - 2022	-194.28	-294.80	-93.76	***
2023 - 2020	-145.90	-235.55	-56.26	***

Profitability Analysis

Analysis of variance (ANOVA) and Tukey's mean comparison of cotton lint profitability across seven cultivars for the period 2020-2023 were conducted using PROC ANOVA in Statistical Analysis System software (SAS) version 9.4 to assess the profitability of various cotton cultivars. For these analyses, profit ($/acre) serves as the dependent variable while variety and year serve as class variables with an interaction between year and variety. Additionally, two sensitivity analyses were conducted in Microsoft® Excel® for Microsoft 365 Microsoft Online (MSO) to assess how overall profitability of the cotton enterprise varies when market prices and yield levels fluctuate. The results highlight profitability differences between conventional upland and hybrid Pima production. Figure 8 displays boxplots of profit ($/acre) by both year and cultivar, while Figure 9 reports boxplots of profit ($/acre) by year only.

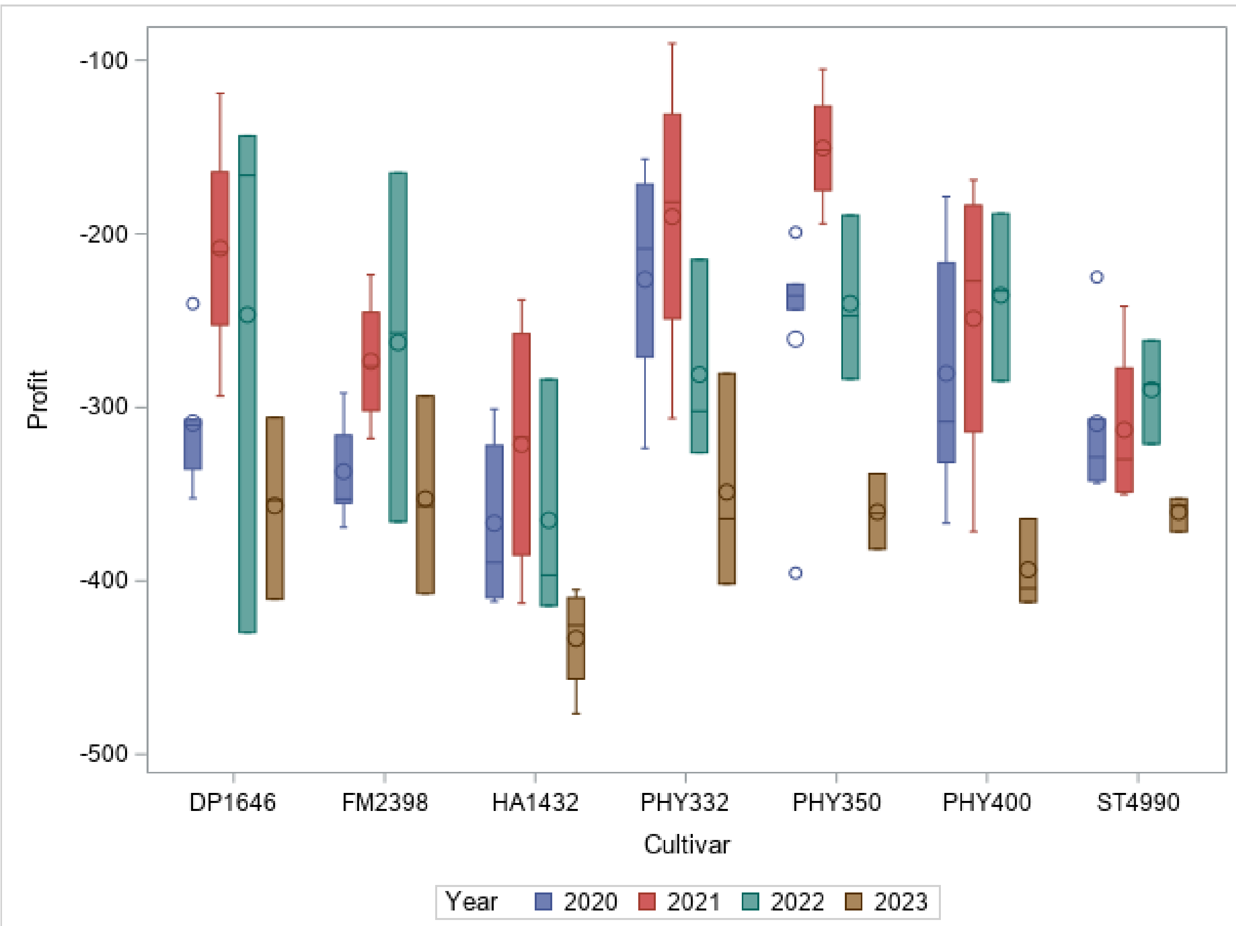

Figure 8. Boxplots of Profit (4/Acre) by Year and Cultivar

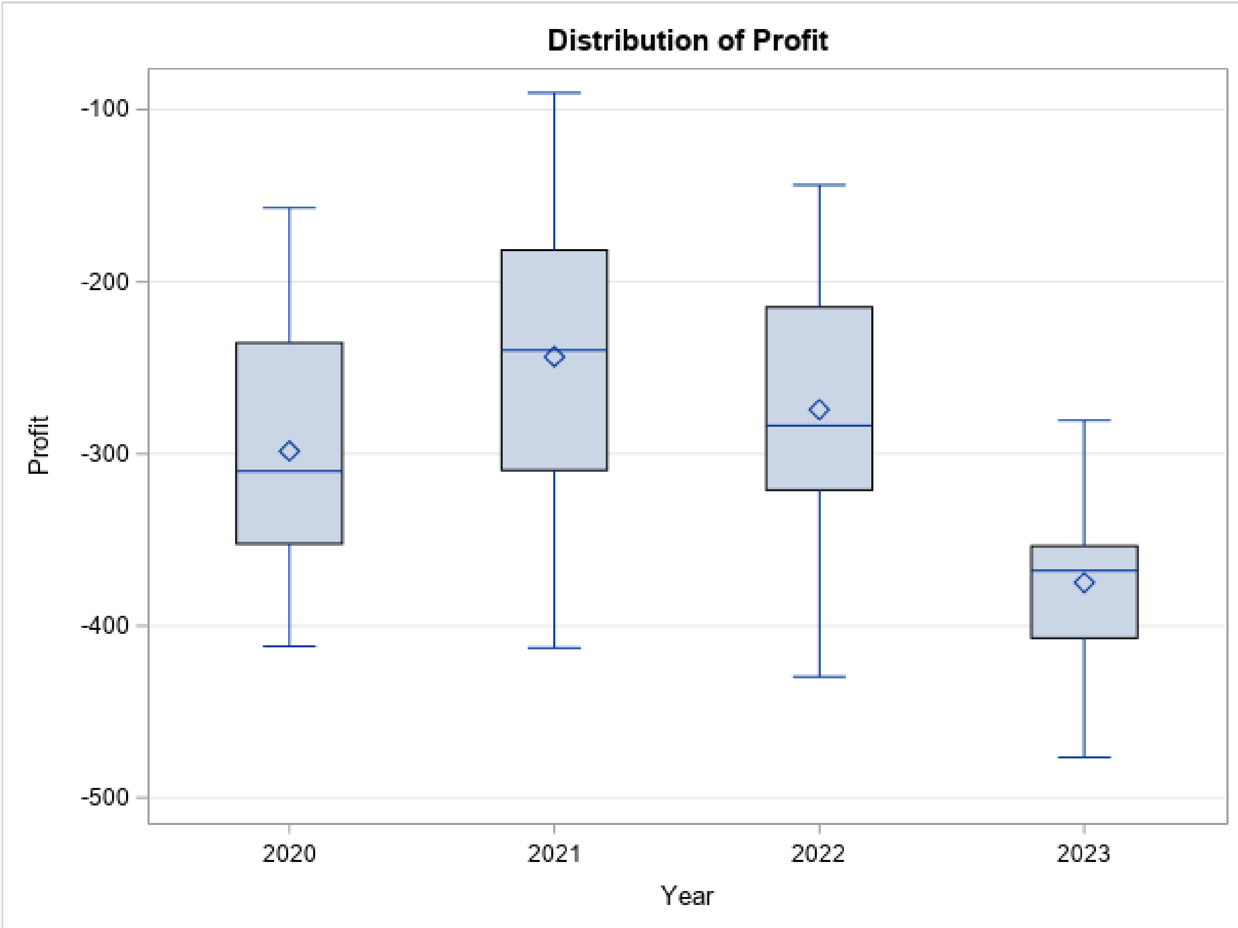

Figure 9. Boxplots of Profit ($/Acre) by Year

Overall, for the period 2020-2023, there were statistical differences in profitability by year, indicated by an *F*-statistic of 18.05 (p-value less than 0.0001). Table 5 presents the results from this analysis. Losses ranged from –$243.64/acre in 2021 to –$374.05/acre in 2023. Profitability between the years 2020, with a loss of -$298.46/acre and 2021, with a loss of -$243.64//acre, was statistically different from one another, with losses in 2023 being statistically different from the losses in all other years at the 5% significance level. The biggest loss was in 2023 due to low yields associated with unideal weather conditions during the growing season.

Table 5. Analysis of Variance for Profit ($/Acre) by Year

Comparisons significant at the 0.05% level are indicated by ***				
Cultivar Comparison	Differences between means	Simultaneous 95% confidence Limits		
2021 - 2022	30.70	-18.02	79.43	
2021 - 2020	54.82	12.02	97.62	***
2021 - 2023	131.32	83.23	179.41	***
2022 - 2021	-30.70	-79.43	18.02	
2022 - 2020	24.12	-22.48	70.71	
2022 - 2023	100.62	49.12	152.11	***
2020 - 2021	-54.82	-97.62	-12.02	***
2020 - 2022	-24.12	-70.71	22.48	
2020 - 2023	76.50	30.57	122.43	***
2023 - 2021	-131.32	-179.41	-83.23	***
2023 - 2022	-100.62	-152.11	-49.12	***
2023 - 2020	-76.50	-122.43	-30.57	***

There were also statistical differences in profit or loss by cultivar, indicated by an *F*-statistic of 6.89 (p-value of less than 0.0001). Figure 10 provides a visual representation of profit ($/acre) by cultivar, while Table 6 presents ANOVA results for profit ($/acre) by cultivar. Losses ranged from -$247.09/acre for PHY 350 to -$316.55/acre for ST 4990. For HA 1432, the loss averaged -$371.66/acre. Tukey's studentized range test for profit indicated significant differences between profitability from hybrid Pima and high-yielding upland cultivars. PHY 350, PHY 332, PHY 400, and DP 1646 all has significant differences in profit compared to hybrid Pima. Loan values averaged 50.81 cent/lb for upland cultivars and 54.18 cent/lb for hybrid Pima when both are saw ginned. Overall, our estimates indicate a loss of -$281.46 per acre for upland and a loss of -$371.66 for hybrid Pima.

Tables 7, 8, and 9 estimate profits ($/acre) from the production of upland or hybrid Pima cotton in Northeast Texas for the period 2020-2023, utilizing 10-year average market price received (USDA, 2022a, 2022b). Table 7 provides production cost comparison for upland and hybrid Pima cotton. These cost estimates are from Texas A&M AgriLife Extension (Johnson, 2024). Total costs are higher for hybrid Pima compared to the upland cotton due to the hybridization cost associated with this cultivar. An additional insecticide treatment was added to hybrid Pima cotton to compensate for the lack of bioengineered technology in cotton seed. Similarly, the cost to transport hybrid Pima lint from the production field in Fairlie, Texas to a roller gin in Maple, Texas was estimated at $3.80/mi for 80,000 lbs (Drake, 2024). For simplicity, this cost was excluded from the overall profitability analysis (Table 9).

Table 8 reports a sensitivity analysis of upland cotton production for various lint yield and market price levels. This profitability analysis (Tables 8 and 9) utilizes cost estimates from Table 7 and reports likely profit scenarios under various cotton lint yield and market price level. For the period 2020-2023, upland cotton averaged lint yields of 472.83 lbs/acre. The lint yield levels in Table 8 range from 200 lbs/acre to 850 lbs/acre, as this spread sufficiently encompasses the estimated yield per acre of cultivars utilized in this study. When the market price of upland cotton lint is 71.0 cents/lb, and lint yield is 500 lbs/acre, a loss of -$201.97/acre is estimated. From the years 2021 to 2023, average market price of upland cotton lint was $0.71/lb. Price data was unavailable for 2020. In 2021, the market price of upland cotton lint was 70.0 cents/lb and average lint yield was 560 lbs/acre, with a calculated loss of –$136.37. In 2022, the market price of upland cotton lint was 71.0 cents/lb and average lint yield was 500lbs/acre, with a calculated loss of -$166.47. In 2022, market price of upland cotton lint was 72.0 cents/lb and average lint yield was approximately 300lbs/acre, with a calculated loss of -$305.47.

Table 7. Production Costs (U.S. Dollars) for Upland and Hybrid Pima Cotton

Description		Upland (U.S. Dollars)	Hybrid Pima (U.S. Dollars)	Description
Variable costs				
	Fertilizer	110	110	Per acre
	Yellow herbicide	12	12	Per acre
	Planting burndown	9.6	9.6	Per 32 oz
	Herbicide 1st application	9.6	9.6	Per 32 oz
	Herbicide 2nd application	9.6	9.6	Per 32 oz
	Cotton Seed	45	125	Per acre
	Herbicide tech fee	18	n.a.	Per acre
	Bt tech fee	9	n.a.	Per acre
	Insurance-cotton	23	23	Per acre
	Insecticide 1st application	3	3	Per acre
	Insecticide 2nd application	3	3	Per acre
	Insecticide 3rd application	n.a.	9	Per acre
	Boll weevil eradication	2	2	Per acre
	Defoliant	14	14	Per acre
	Desiccant	12	12	Per acre
	Transportation	n.a.	3.8*	Per mi for 80k lbs
	Stripping/Picking	50	50	Per 500 lb
	Ginning	60	60	Per 500 lb
	Machinery labor	5.04	5.04	Per 0.42 hr
	Diesel fuel	11.99	11.99	Per 3.33 gal
	Gasoline	4.37	4.37	Per acre
	Repairs and maintenance	17.7	17.7	Per acre
	Interest on credit lines	12.03	12.03	
Fixed costs		80.54	80.54	Per acre
Total cost		**521.47**	**583.47**	

*Note: Transportation cost for Pima is not included in table total.

Table 8. Profitability Analysis for Upland Cultivars

Price Level ($/Lb)									
		0.65	0.70	0.71	0.72	0.75	0.85	0.95	1.05
Yield (Lbs/acre)	200	-391.47	-381.47	-379.47	-377.47	-371.47	-351.47	-331.47	-311.47
	250	-358.97	-346.47	-343.97	-341.47	-333.97	-308.97	-283.97	-258.97
	300	-326.47	-311.47	-308.47	-305.47	-296.47	-266.47	-236.47	-206.47
	350	-293.97	-276.47	-272.97	-269.47	-258.97	-223.97	-188.97	-153.97
	400	-261.47	-241.47	-237.47	-233.47	-221.47	-181.47	-141.47	-101.47
	450	-228.97	-206.47	-201.97	-197.47	-183.97	-138.97	-93.97	-48.97
	500	-196.47	-171.47	-166.47	-161.47	-146.47	-96.47	-46.47	3.53
	550	-163.97	-136.47	-130.97	-125.47	-108.97	-53.97	1.03	56.03
	600	-131.47	-101.47	-95.47	-89.47	-71.47	-11.47	48.53	108.53
	650	-98.97	-66.47	-59.97	-53.47	-33.97	31.03	96.03	161.03
	700	-66.47	-31.47	-24.47	-17.47	3.53	73.53	143.53	213.53
	750	-33.97	3.53	11.03	18.53	41.03	116.03	191.03	266.03
	800	-1.47	38.53	46.53	54.53	78.53	158.53	238.53	318.53
	850	31.03	73.53	82.03	90.53	116.03	201.03	286.03	371.03

Note: Profit ($/acre) calculations reported inside the table.

Similarly, Table 9 reports a sensitivity analysis of hybrid Pima production for various lint yield and market price levels. For the period 2020-2023, hybrid Pima averaged 390.96lbs/acre When the market price of Pima cotton lint is $1.50/lb, and lint yield is 400 lbs/acre, a profit of $16.53/acre is estimated. In 2022, 10-year average market price of Pima cotton lint was $1.48/lb. $1.50/lb was utilized in this analysis for simplicity. Data was unavailable for other years.

Table 9. Profitability Analysis for Hybrid Pima Cultivar

Price Level ($/Lb)									
		0.85	0.95	1.05	1.15	1.25	1.35	1.45	1.5
Yield (Lbs/acre)	200	-413.47	-393.47	-373.47	-353.47	-333.47	-313.47	-293.47	-283.47
	250	-370.97	-345.97	-320.97	-295.97	-270.97	-245.97	-220.97	-208.47
	300	-328.47	-298.47	-268.47	-238.47	-208.47	-178.47	-148.47	-133.47
	350	-285.97	-250.97	-215.97	-180.97	-145.97	-110.97	-75.97	-58.47
	400	-243.47	-203.47	-163.47	-123.47	-83.47	-43.47	-3.47	16.53
	450	-200.97	-155.97	-110.97	-65.97	-20.97	24.03	69.03	91.53
	500	-158.47	-108.47	-58.47	-8.47	41.53	91.53	141.53	166.53
	550	-115.97	-60.97	-5.97	49.03	104.03	159.03	214.03	241.53
	600	-73.47	-13.47	46.53	106.53	166.53	226.53	286.53	316.53
	650	-30.97	34.03	99.03	164.03	229.03	294.03	359.03	391.53
	700	11.53	81.53	151.53	221.53	291.53	361.53	431.53	466.53
	750	54.03	129.03	204.03	279.03	354.03	429.03	504.03	541.53
	800	96.53	176.53	256.53	336.53	416.53	496.53	576.53	616.53
	850	139.03	224.03	309.03	394.03	479.03	564.03	649.03	691.53

Note**:** Profit ($/acre) calculations reported inside the table.

Conclusions

This study evaluated the economic feasibility of reestablishing Long Staple cotton production in Northeast Texas. The research utilized cotton lint yield data, input costs estimated by Texas AgriLife Extension (Johnson, 2024) and USDA loan values to investigate the agronomic performance and profitability of six upland cotton cultivars and one hybrid Pima cultivar. Yield data was collected from field experiments conducted in Fairlie, Texas for the period 2020-2023. Two-factor analysis of variance (ANOVA) was used to evaluate statistically significant differences in lint yield and profitability across the seven cultivars and four-year duration of the study. The findings indicate generally similar yields and profitability across cultivars involved in this study. For the period 2020-2023, upland cotton averaged lint yields of 472.83 lbs/acre and the hybrid Pima averaged 390.96 lbs/acre. Sensitivity analyses report profitability under various yield and market price scenarios. The study concludes that hybrid Pima production can be an economically viable substitute for upland cotton.

Lint yield across cultivars were not generally statistically significant in this study; however, there were instances in which profit by cultivar resulted in significant differences. HA 1432 had statically lower profit compared to four upland cultivars (PHY 335, PHY 350, PHY 400, and DP 1646) when utilizing USDA loan values for lint price. There were also statistically significant differences in means of lint yield and profit across the years. Hybrid Pima consistently produced less lint yield compared to the upland cultivars; overall input costs per acre were higher due to the price of hybrid seed, and market price was nearly twice that of upland. Upland cotton producers are expected to obtain a loss of -$166.47/acre when market prices equal the loan value of 71.0 cents/lb and lint yield is 500 lbs/acre. On the other hand, hybrid Pima producers are expected to obtain a profit of $16.53/acre when market prices equal $1.50/lb and lint yield is 400 lbs/acre. However, hybrid Pima producers incur an additional transportation expense to roller gin facilities, estimated at $3.80/mi per 80,000lbs, which was not included in the profit calculation. Certain high-yielding upland cultivars may be beneficial for reducing losses when market prices are poor.

While these results look promising for establishing the feasibility of hybrid Pima production in Northeast Texas, additional research is needed to evaluate the economic durability of producing this cultivar. Growing low-yielding, high-value commodities is a relatively new production method for cotton production, and more time data is needed to understand long-term yield and profits. Additional profitability analyses should be undertaken utilizing input costs and market prices of cotton lint in subsequent years. Future research should include the additional cost of hybrid Pima seed and transportation to a roller gin facility, as well as utilize the market price of roller ginned Pima cotton lint. Additionally, adding more cotton cultivars to these studies could provide a better understanding of how competitive the lint yield and profitability of hybrid Pima is given a larger cultivar selection.

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