FARM Assistance Focus

TEXAS A&M AGRILIFE EXTENSION

Panhandle Model Farms - 2016 Case Studies of Texas High Plains Agriculture

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Farm Assistance Focus 2016-3
November 2016

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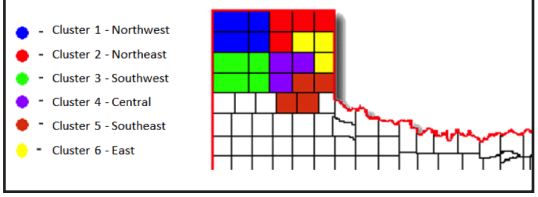
Planning Solutions

The Model farm process attempts to illustrate production agriculture in the Northern Texas Panhandle.

Texas High Plains producers often need realistic examples of crop and livestock operations to facilitate communication between local officials, commodity associations and agricultural lenders. To encourage interaction between these different interest groups and simplify decision making, Texas A&M AgriLife Extension risk management specialists developed region-specific model farms. These case study operations attempt to illustrate typical production agriculture in six distinct areas of the Northern Texas Panhandle.

Figure 1. Study Area



Model Farm Overview

Model farms were created by organizing focus groups and collecting industry data. Texas A&M AgriLife Extension District 1 consists of 22 counties in the High Plains region. For study purposes, these counties were grouped into six clusters, each representing similar cropping and livestock systems (Figure 1). Risk management specialists then conducted focus groups within each cluster that consisted of county agents, agricultural producers, Farm Service Agency employees and agribusiness representatives. During these meetings, participants described the structure and characteristics of a realistic operation in their respective areas. Farm price data was gathered through Texas Cattle Feeders Association market summary reports and Chicago Board of Trade futures settlement sheets and adjusted with focus group input for local basis. Crop yields and cattle stocking rates came primarily from focus group estimates.

The following information provides a summary of model farm characteristics by cluster. Operational demographics vary greatly by county group, reflecting the diversity of Texas High Plains Agriculture. Overall, eight different crops are analyzed with both dryland and irrigated production practices. Several entities also include leased stockers, owned stockers, and/or cow-calf herds. Government payments are incorporated into each analysis, assuming that all farms are enrolled in the Price Loss Coverage program and eligible for Loan Deficiency Payments. Finally, most operations implement a specific equipment replacement strategy over the analysis period.

Cluster 1. The Northwest model operation encompasses 3,000 acres that are 40% owned and 60% leased. A crop lease agreement involving 33% revenue sharing is incorporated on corn, wheat and cotton, with the landlord paying a percentage of fertilizer, chemicals and irrigation. All commodities are operator sprayed, and only cotton is custom harvested. Stocker cattle are not factored into the analysis.

Table 1. 2016 Characteristics of Cluster 1 Model Farm, Northeast

Crops	Acres	Yield/Ac	Price	Stocker	
Irr Corn	600	230 bu	$3.61/bu	# Head	0
Corn Silage Irr	300	27 tons	$33.50/ton	Lease Rate	$0.00
Irr Cotton	450	750 lbs	$0.60/lb	In Weight	0 lbs
Irr Wheat	270	60 bu	$4.29/bu	Out Weight	0 lbs
Dry Wheat	250	15 bu	$4.29/bu	ADG	0 lbs
Wheat Silage	180	15 tons	$31.50/ton		
Irr Seed Sorghum	300	107.14 bu	$9.93/bu		
Irr Sorghum	150	89.30 bu	$3.21/bu		
Dry Sorghum	250	25 bu	$3.21/bu		
Fallow	250	N/A	N/A		
Total Acres	3000				

Eight different crops are analyzed, having both dryland and irrigated production practices.

Cluster 2. The Northeast model operation is a 3,000 acre crop farm and stocker enterprise that's 40% owned and 60% leased. A lease agreement involving 33% revenue sharing is incorporated on corn, wheat and sorghum with the landlord paying a percentage of fertilizer, chemicals and irrigation. All commodities are farmer sprayed, and only cotton is custom harvested. The operation also takes in 200 head of stockers annually at a 2016 lease rate of $0.42 per pound of gain. Cattle graze for approximately 134 days with an estimated average daily gain of 1.5 pounds.

Table 2. 2016 Characteristics of Cluster 2 Model Farm, Northeast

Crops	Acres	Yield/Ac	Price	Stocker	
Irr Corn	600	220 bu	$3.61/bu	# Head	200
Irr Cotton	150	1100 lbs	$0.60/lb	Lease Rate	$0.42
Irr Wheat	600	60 bu	$4.29/bu	In Weight	540 lbs
Dry Cotton	500	450 lbs	$0.60/lb	Out Weight	650 lbs
Dry Wheat	500	20 bu	$4.29/bu	ADG	1.5 lbs
Irr Sorghum	150	105 bu	$3.21/bu		
Fallow	500	N/A	N/A		
Total Acres	3,000				

Cluster 3. The Southwest Texas Panhandle model consists of a 3,040 acre crop farm and stocker operation that's 75% owned and 25% leased. The lease agreement is 33% revenue sharing on both dryland and irrigated crops, with the landlord paying a percentage of fertilizer, chemicals and irrigation. All commodities are farmer sprayed, and only cotton is custom harvested. The operation also takes in 200 head of stockers annually at a 2016 lease rate of $0.42 per pound of gain. Cattle graze for 120 days with an estimated average daily gain of 1.75 pounds.

Table 3. 2016 Characteristics of Cluster 3 Model Farm, Western

Crops	Acres	Yield/Ac	Price	Stocker	
Irr Corn	200	215 bu	$3.61/bu	# Head	200
Irr Corn Silage	105	28 tons	$33.50/ton	Lease Rate	$0.42
Irr Cotton	250	1100 lbs	$0.60/lb	In Weight	450 lbs
Dry Cotton	250	450 lbs	$0.60/lb	Out weight	660 lbs
Sorghum Silage	115	23 tons	$29.50/ton	ADG	1.75 lbs
Irr Sorghum	170	110 bu	$3.21/bu		
Irr Wheat	200	65 bu	$4.29/bu		
Dry Wheat	500	18 bu	$4.29/bu		
Dry Sorghum	250	27 bu	$3.21/bu		
Native Pasture	1000	N/A	N/A		
Total Acres	3,040				

Cluster 4. The Central Texas Panhandle model encompasses 3,240 crop acres that are 50% owned and 50% leased. The lease agreement is 33% revenue sharing on corn, wheat, sorghum and cotton, with the landlord paying a percentage of fertilizer, chemicals and irrigation. All crops are operator sprayed, and only cotton is custom harvested. Stocker cattle are not factored into the analysis.

Study results are illustrated based on the long-term (5-year) financial projections of each model farm and represent a general economic outlook for area producers. Results vary widely by county group.

Table 4. 2016 Characteristics of Cluster 4 Model Farm, Central

Crops	Acres	Yield/Ac	Price	Stocker	
Irr Corn	428	210 bu	$3.61/bu	# Head	0
Irr Cotton	428	1100 lbs	$0.60/lb	Lease Rate	$0.00
Irr Wheat	214	55 bu	$4.29/bu	In Weight	0 lbs
Dry Wheat	724	20 bu	$4.29/bu	Out Weight	0 lbs
Dry Sorghum	724	27 bu	$3.21/bu	ADG	0 lbs
Fallow	722	N/A	N/A		
Total Acres	3, 240				

Cluster 5. The Southeast Texas Panhandle model consists of a 7,000 acre crop farm and cattle operation that's 18% owned and 82% leased. A lease agreement involving 33% revenue sharing is incorporated on cotton and peanuts with the landlord paying a percentage of fertilizer, chemicals and irrigation. All crops are farmer sprayed and harvested. The operation also has 50 head of cows with an 82% calving rate. Calves are sold at weaning weighing approximately 500 pounds.

Table 5. 2016 Characteristics of Cluster 5 Model Farm, Southeast

Crops	Acres	Yield/Ac	Price	Cow Herd	
Irr Cotton	936	1350 lbs	$0.60/lb	# Head	50
Dry Cotton	3,752	350 lbs	$0.60/lb	Culling Rate	10%
Irr Peanuts	312	2.05 tons	$386/ton	Calving Rate	82%
Native Pasture	2,000	N/A	N/A	Weaned lbs	500 lbs
Total Acres	7,000			Weaned $	$1.62/lb

Cluster 6. The East Texas Panhandle model involves a 4,530 acre cattle operation that's 100% owned. All land is grazed and consists of wheat pasture, forage sorghum and native grass. The operation has 200 head of cows with an 85% calving rate and a 500 pound weaning weight. The operation sells approximately 40% of its calves at weaning and retains the remaining 60% as stocker cattle. Stockers graze for approximately 150 days with an average daily gain of 1.75 pounds

Table 6. 2016 Characteristics of Cluster 6 model Farm, Southeast

Crops	Acres	Yield/Ac	Price	Cow Herd	
Native Pasture	3840	N/A	N/A	# Head	200
Dry Wheat Graze	210	N/A	N/A	Culling Rate	10%
Forage Sorghum	50	N/A	N/A	Calving Rate	85%
Improved Pasture	430	N/A	N/A	Weaned lbs	500 lbs
Total Acres	4,530	N/A	N/A	Weaned $	$1.62/lb
				Stocker	
				# Head	100
				In Weight	500 lbs
				Out Weight	750 lbs
				ADG	1.75 lbs
				Stocker $	$1.38/lb

Overall, every farm exhibits a decline in projected financial performance from 2016-2020 due to low commodity prices and rising input costs.

Analysis and Results

After developing six model operations, risk management economists performed a study analysis using the Texas A&M AgriLife Extension Service's Financial and Risk Management (FARM) Assistance Program. FARM Assistance is technically a long-term pro forma financial analysis that incorporates the research methods of stochastic simulation. It is aimed at helping farmers and ranchers with strategic planning and risk management. Study results show the five-year projected outlook for each cluster farm, and represent a general economic overview for area producers. Poor financial outcomes do not necessarily indicate an operational demise, but rather identify problem areas that may require attention. Table 7 exhibits performance indicators from 2016-2020 by county cluster. Several measures help evaluate economic viability. Net cash farm income (NCFI) determines profitability and represents the amount of money available for debt repayment, tax expenditures, capital equipment replacement, investment or withdrawal by the owner. Equity is calculated through real net

Table 7. Average Financial Performance of Cluster Farms from 2016-2020

		Cluster 1 Northwest	**Cluster 2** Northwest	**Cluster 3** Southwest	**Cluster 4** Central	**Cluster 5** Southeast	**Cluster 6** East
Average Annual Financial Performance (2016-2020)							
Net Cash Farm Income		$180,060	$101,070	$61,120	$51, 990	$44,430	$4,950
Expense to Receipts Ratio		80%	81%	82%	84%	94%	60%
Return to Assets Ratio		8.08%	5.52%	4.18%	3.41%	4.58%	1.00%
5-Year (Beginning 2016/Ending 2020) Equity, Solvency, and Liquidity Positions							
Debt / Asset	2016	58%	59%	59%	47%	55%	23%
	2020	60%	64%	61%	61%	72%	26%
Real Net Worth	2016	$1,107,578	$1,075,550	$933,400	$1,566,050	$852,522	$3,865,886
	2020	$1,010,950	$979,910	$930,840	$1,289,210	$574,800	$3,188,630
Prob of Ending Cash < $0	2016	85%	86%	85%	83%	65%	83%
	2020	97%	98%	99%	98%	93%	99%

worth (RNW) and shows the total value of all assets net of any debts owed. The debt-to-asset ratio measures operational solvency while the return-to-asset ratio determines financial efficiency. Finally, the operating expenses to receipts ratio measures the costs of operating a farm or ranch relative to the income it brings in.

Overall, every cluster farm exhibits a decline in projected financial performance from 2016-2020 due to low commodity prices and rising input costs. This situation causes increasing operational debt levels and decreasing cash balances (Table 7). Although all entities are negatively impacted by weak markets, some fare better than others. Northwest Cluster 1 maintains the highest profitability level among farms, with an average net cash income of $180,060. This result is partially due to planting the greatest percentage of irrigated crops (70%), which often leads to higher yields and more favorable returns. Cluster 1's larger profits also result in a desirable return to assets ratio (8.08%) and satisfactory operating expenses to receipts ratio (80%) over the analysis period. Northeast Cluster 2 demonstrates the next highest profitability level, with a net cash income of $101,070 and a 5.52% return on assets. Like Cluster 1, Cluster 2's irrigated acres (50%) contribute to improved returns.

A conclusion can be drawn that enterprises in the upper Texas Panhandle region fared better than those in the lower portion, likely due to a greater percentage of irrigated production.

Southwest Cluster 3, Central Cluster 4 and Southeast Cluster 5 show marginal financial conditions, with net cash farm incomes of $61,120, $51,990, and $44,430, respectively, and return to assets ranging from 3.5% to 4.5%. However, while Clusters 3 and 4 project input costs similar to Northern Panhandle farms, Cluster 5's are much higher. A 94% operating expense to receipts ratio means that the farm spends 94 cents in operating cost to produce each dollar of revenue, a thin margin that results in a high risk profile. This situation is primarily due to having a large percentage of dryland acres (75%) and a cow/calf herd. Cattle prices are projected to fall more significantly than crops from 2016-2020. Cluster 5 needs to reduce expenses in order to achieve long term viability. East Cluster 6 shows the least desirable profitability among all farms analyzed. This result is exemplified by a weak average net cash farm income of $4,950 and a low return to assets of 1%. Like Cluster 5, poor cattle prices contribute heavily to this undesirable financial condition. While Cluster 6 does exhibit weak profit margins, having a large percentage of owned land helps to keep its operating ratio, equity position and debt levels within acceptable ranges.

Summary and Conclusions

Six model operations representing 22 Northern Texas Panhandle counties were developed in an effort to facilitate communication between producers, local officials, commodity associations and agricultural lenders. Based on focus group characteristics and FARM Assistance analyses, the Northwest and Northeast enterprises displayed more desirable financial conditions. Farms located in the Southwest, Central and Southeast regions demonstrated marginal outcomes, while the Eastern operation showed a weak profit potential. A conclusion can be drawn that enterprises in the upper Texas Panhandle region fared better than those in the lower portion, likely due to a greater percentage of irrigated production. Furthermore, farms with smaller operating expense to receipts ratios showed more desirable solvency levels and greater risk tolerance than those with less efficient expense management (Figures 2 and 3). While overall some operations appeared more financially stable than others, all six farms projected substantial liquidity risk that did not improve over the planning horizon. They also exhibited rising debt levels and a loss of equity from 2016-2020 (Table 7). Based on these results, careful expense management and aggressive marketing is highly recommended to all Texas Panhandle producers facing uncertain financial and production conditions.

Figure 2. Operating Expense to Receipts Ratio from 2016-2020

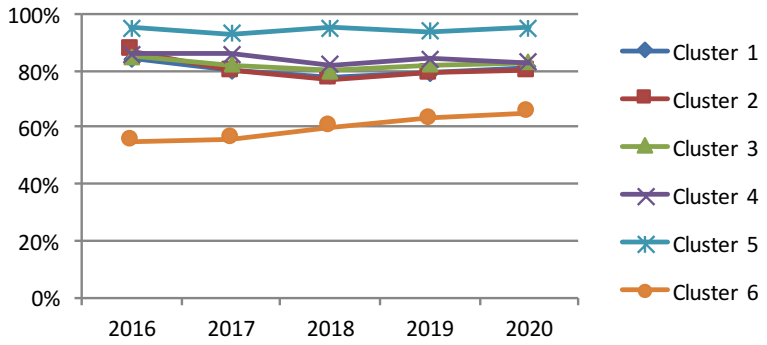


Figure 3. Average Debt to Asset Ratio from 2016-2020

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