

Economic Considerations for Pecan Producers
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Industry Overview

The United States is the world's largest consumer and exporter of pecans and traditionally, the U.S. market has set the tone for the rest of the world. Unfortunately, foreign trade disputes can and do happen. Pecan exports to Asia have seen some positive activity since the "great fall" at the onset of a trade war back in 2018 when tariffs levied against US pecans caused a plummet in exports to China, our largest customer in the region.

Chinese demand is now being filled largely by a limited foreign pecan supply and market traders are paying more attention to southern hemisphere production regions like South Africa, Australia, Brazil, and Argentina. The world pecan market is projected to grow 6% annually. While that kind of news might be perceived as supportive for U.S. growers, you can bet the farm that foreign countries growing pecans will continue to have larger crops year after year as new plantings come into production. Of course, political pressures always play a role in foreign demand for U.S. pecans and the Chinese market can be very unpredictable to navigate.

Locally, pecans are a significant crop in Oklahoma consistently ranking in the top 15 in gross value of production. Nationally, Oklahoma is generally in the top six in cultivated pecan varieties and generally accounts for about a third of the native crop. Georgia, New Mexico, and Texas remain the top three producing states, around 80% of the total 2021 crop. Oklahoma accounts for only 5% of the total utilized crop.

On a national level, the pecan market pales in comparison to other major commodities like corn or wheat. Even in the tree nut market, the value of pecan production is a small fraction in comparison to almonds, pistachios, and English walnuts. U.S. pecan production in 2021 was worth about \$551 million according to the U.S. Department of Agriculture and around \$17.5 million in Oklahoma (recall that production last year was a train-wreck for many commercial producers due to adverse weather events in 2020). The tree nut market value of production in the United States is typically around \$10 billion.

Pecan production in the U.S. has not grown significantly since the early 1980s while the competition has expanded over the same time-period. However, marketing efforts are beginning to yield result and increase demand when the Pecan Promotion, Research, and Information Order was implemented in February 2021. The program is financed by an assessment on domestic producers and importers of pecans. The initial assessment rate is

\$0.02 per pound on in-shell pecans and \$0.04 per pound on shelled pecans. Handlers will collect assessments from producers based on pounds of pecans received and importers will pay assessments on pecans when they enter the United States. Entities that produce or import less than 50,000 pounds of in-shell pecans, 25,000 pounds of shelled pecans, or a combination of the two, on average for four fiscal periods will be exempt from paying assessments. A 17-member American Pecan Promotion Board will oversee the program.

Although planted orchards may generate per acre net returns substantially higher than conventional crops grown in Oklahoma, there are numerous challenges that need to be considered. Because commercially viable pecan operations take around 7-10 years to develop and/or expand, increasing pecan supply is reserved only for the well-financed, and patient. Current and potential pecan growers need production, marketing, and financial information to make informed decisions about starting, expanding or leaving their existing operations. Producers should have a full understanding of what it takes to be successful, as it requires a significant investment of time, money, and knowledge. Oklahoma's range of geographies and overall climate presents many challenges to the pecan industry.

Grower Considerations and Keys to Success

1. **Markets.** Many growers sell their pecans for cash at harvest in the shellers market, either by the pound or by the point. There are a number of alternatives that growers may want to consider instead. The holiday and value-added markets may result in a higher price for pecans, but quality is a necessity. If the quality is good, your customers will probably be the best public relations asset. If the quality is poor, they will be your worst liability in today's social media environment.

Shell-out percentage refers to the amount of nut meat yield relative to the weight of the whole pecan. Once pecans are sampled and graded, the producer's price is calculated. Most buyers base their in-shell pecan price on the per-point price they expect to receive for nut meats rather than the whole in-shell pecan. For this reason it is extremely important for producers to know the shell-out percentage of their pecans in order to receive the greatest value for their crop. Price expectations for pecan nut meats are influenced by factors such as the current year production of pecans, current supply of competing nuts, demand for nuts, imports and exports of pecans and other nuts, and the quantity of pecans and other nuts carried over from the previous year. To arrive at a price for producers' in-shell pecans, shellers subtract estimated shelling costs and profit margin from the price expected for nut meats.

2. **Education.** A producer had better know what they are doing or a pecan operation may be a painful lesson in the pocketbook. You will need to have an eye for detail, be able to follow set procedures, and understand the complexities involved. Talk to local growers and Extension personnel. For example, a unique characteristic of pecan trees is that they are alternate bearing (AB), meaning the plant will produce a heavy crop one year and a light crop the next year. AB is internally regulated by the plant, but can be triggered by poor management practices, which often depletes the tree's energy reserves. For a commercial pecan orchard to be successful over the long

haul, it is recommended that producers strive in achieving a consistent moderate crop annually.

Producers should focus on financial management as much as production performance. Realize that alternatives that appear profitable for one producer may not work for another. Have an open mind. Reject the “that won’t work here” or “this is the way we’ve always done it” paradigm. Everyone’s experience levels, managerial abilities, and willingness to assume risk is different. Knowledge of budgeting (as discussed later) and the ability to use them will help you make the right decision.

3. **Investment.** Pecans are not an overnight sensation as most pecan orchards take from 7-10 years to come into commercial production, and another 3-5 years to reach peak production. However when the pecan tree does reach peak production, if properly maintained the orchard can stay in peak production for over 100 years, making it a very attractive intermediate to long term investment. One of the most important aspects to consider when establishing a pecan orchard is its size. The mechanical equipment needed for a 10-acre orchard is essentially the same for a 100-200 acre orchard. Smaller orchards often have reduced profitability due to equipment costs. Custom harvesters commonly charge 50 percent of the crop to cover their costs and allow some room for profit.

With a newly established pecan orchard, be prepared for 7 to 10 years with no income while you still dedicate time to the enterprise. Pre-productive expenditures can vary greatly depending on planting density and years prior to first harvest. Annual expenses for producing orchards easily exceed \$1000 per acre. Even with native trees, annual expenses may run several hundred dollars per acre. If financing is required, is it available? If so, educate your lender about marketing and production practices. Provide him with a detailed business plan along with current and pro-forma financial statements.

4. **Proceed with caution when trying new things.** This is especially the case if you have limited knowledge of production practices and/or farm machinery. It will help you learn about growing pecans without taking any unnecessary risks along the way. Don’t start too big!
5. **Enterprise budgets.** Lacking the information needed to make perfect decisions, specialty crop producers are forced to use the best information available and take calculated risks. Enterprise budgets are the foundation for risk-management decisions. An enterprise budget estimates the full economic costs and returns projected to accrue to an activity - raising livestock, producing grain, growing pecans - for some period, generally one year. They facilitate comparisons of profitability while documenting resources, management practices and technology used in production. Budgets are the cornerstone of a business plan since they provide an idea as to the economic feasibility of the venture. OSU budgets are available for an individual operation <https://extension.okstate.edu/programs/farm-management-and-finance/budgets/index.html>

Enterprise Budget Components and Concepts

Three general types of costs comprise the total cost of producing any type of farm commodity. They are variable (operating), fixed, and overhead expenses. Overhead expenses are difficult to allocate among individual enterprises. Examples include telephone, electricity and accounting services. Overhead expenses are included in whole-farm budgets, but are generally excluded (as shown in the pecan examples) in enterprise budgets. Variable costs are illustrated in operating input section while fixed expenses are shown in the fixed cost section.

A sample budget of an improved pecan orchard is shown in Table 1.

Table 1. Improved Pecan Budget Summary.

Irrigated Improved Pecan Enterprise Budget

80 acres farmed.



Name

Farm Description

				Total
PRODUCTION	Units	Price	Quantity	\$/Acre
Pecans	Lbs.	\$ 2.25	1000	\$ 2,250.00
Other Income	Acre	\$ -	0	\$ -
Total Receipts				\$ 2,250.00
OPERATING INPUTS	Units	Price	Quantity	\$/Acre
Fertilizer	Acre	\$ 141.67	1	\$ 141.67
Custom Harvest	Acre	\$ -	0	\$ -
Disease Control	Acre	\$ 105.61	1	\$ 105.61
Insect Control	Acre	\$ 247.40	1	\$ 247.40
Weed Control	Acre	\$ 21.63	1	\$ 21.63
Pruning Labor	Hrs.	\$ 18.25	1.00	\$ 18.25
Thinning Labor	Hrs.	\$ 18.25	0.75	\$ 13.69
Harvest Labor	Hrs.	\$ 18.25	19.18	\$ 350.04
Cleaning Labor	Hrs.	\$ 18.25	1.00	\$ 18.25
Post-Harvest/Marketing	Acre	\$ 9.95	1	\$ 9.95
Annual Operating Capital	Dollars	5.75%	439.11	\$ 25.25
Machinery Labor	Hrs.	\$ 18.25	10.65	\$ 194.36
Irrigation Labor	Hrs.	\$ 18.25	0.24	\$ 4.38
Custom Hire	Acre	\$ -	0	\$ -
Machinery Fuel, Lube, Repair	Acre	\$ 293.80	1	\$ 293.80
Irrigation Fuel, Lube, Repair	Acre	\$ 57.81	1	\$ 57.81
Other Expense	Acre	\$ 35.00	1	\$ 35.00
Total Operating Costs				\$ 1,537.09
Returns Above Total Operating Costs				\$ 712.91
FIXED COSTS	Units	Rate		\$/Acre
Establishment	Acre	\$4,786.17		\$ 221.90
Machinery/Irrigation	\$/value			
Interest at	Dollars	5.00%		\$ 101.12
Taxes at	Dollars	1.00%		\$ 23.74
Insurance	Dollars	0.85%		\$ 17.19
Depreciation	Dollars			\$ 161.65
Land	\$/acre	\$ -		
Interest at	Dollars	0.00%		\$ -
Taxes at	Dollars	0.00%		\$ -
Total Fixed Costs				\$ 525.60
Total Costs (Operating + Fixed)				\$ 2,062.69
Returns Above All Specified Costs				\$ 187.31

Variable Costs

Variable costs are those operating inputs that vary as the level of production changes. They are items that will be used during one operation year or one production period. They would not be purchased if production were not undertaken. Variable costs may also be classified as cash or non-cash in nature. For instance, labor expenses are included in the operating input section. No differentiation is made between owner supplied or hired labor. This means that whether the farm operator or his family supplies labor, a wage rate that represents a salary if employed elsewhere is shown. Many operators have told me over the years, “I don’t have to be paid to be here.” especially when times are tough. However, if one is not able to pay ones-self a decent wage, that is not much of a business to run. If zero labor costs are assumed, residual earnings (as defined by Returns Above Total Operating Costs below) includes labor income. The producer can then decide whether this return is satisfactory compensation for one’s efforts.

Fixed Costs

Fixed costs are those that do not change with the level of production. Generally, fixed costs are those ownership costs associated with buildings, machinery, and equipment that are pro-rated over a period of years. Fixed costs may also be cash or non-cash in nature. Real estate taxes, personal property taxes and insurance are examples of cash fixed costs. Non-cash costs such as depreciation and interest on capital investment result in foregone opportunities. A closer inspection of the fixed costs in a pecan budget follows.

The interest charge for durable assets such as machinery and irrigation system used in the operation is based on the average amount of capital invested over the ownership period, usage per year, and an interest rate. Money that is tied up in these capital assets could have earned a return in an alternative use. This foregone opportunity is what economists define as opportunity costs and reflects a payment to the farmer’s owned resources.

Depreciation represents an attempt to spread the investment costs or purchase price of durable assets over their productive lifetime. It is typically the largest cost associated with ownership. For example, when a tractor is worn out, it should be completely “paid for” by depreciation. A producer must, in effect, save this much every year or reinvest it in machinery and equipment, or he will eventually find himself with worn out items and no cash reserves to replace them.

Taxes vary by region but are generally a function of average value. In the illustrated budgets, the annual charge for taxes is based on 1% of the purchase price.

Insurance policies are usually carried on more expensive machines while the farmer generally assumes the risk of loss on the simpler, less expensive assets. The insurance costs are based on the average amount of capital invested times an insurance rate.

Since improved pecans are a multi-year crop, the establishment cost needs to be allocated over several years. Establishment cost is the sum of the costs for land preparation, planting trees, and other production expenses for the years preceding the first marketable

harvest (assumed to be the eighth growing season) year. The cost recovery method is utilized (AAEA Task Force) where annual preproductive costs are accrued to a future value at the end of the preproductive period. The total of these costs is then amortized over the life of the enterprise based on the orchard's useful or productive life.

Production

The total quantity of production is multiplied by the actual or expected price to determine a value for production. In the illustrated budgets, the expected yield is based on the mature production potential of the trees.

Returns Above Total Operating Costs

The returns to fixed costs, land, risk, and management is computed by subtracting total operating costs from total receipts. As long as returns are greater than total operating costs, production is economically rational for an enterprise already in production. This means that the operation will probably be able to pay the bills at least in the short-run.

Returns Above All Specified Costs

In determining overall enterprise profitability, fixed costs need to be part of the profit equation. Returns to management, land, and risk is calculated by subtracting total variable and fixed costs from operating revenues. This amount is residual earnings to the producer for management and to land (because land costs can have a large variation within a region, land costs are excluded). Each individual must decide whether this return is a sufficient reward for management skills, risk taking, and land devoted to the enterprise. Essentially, this is your salary. It should be noted that since non-cash items may be included in fixed costs, profits as shown here are not the same as net cash or operating receipts as shown in a cash flow statement.

Preliminary budget estimates for improved pecans in Oklahoma suggest the following figures exclusive of fixed costs (Table 2). Years 0-7 is the preproductive period (year zero is a "green crop" year prior to planting trees in year one) for the enterprise. By year eight, some marketable production is being harvested.

Having a positive return above operating costs indicates the operation is able to contribute to fixed costs associated with owning capital assets. By the time pecans are assumed to reach their mature yield, a positive returns above all specified costs indicate that the operation is self-supporting and shows an amount available for reinvestment in the business or family living. In cases where operating costs are covered, but the return above all costs is negative, insufficient income is generated to cover all fixed costs, but at least make a contribution to retained earnings. Losses may be a short-run problem depending on production or cost circumstances within a given year. Table 3 represents a native pecan operation.

Table 2. Preliminary Budget Estimate Summary for Producing Improved Pecans in Oklahoma.

Year	Operating Cost (\$/a)	Fixed Cost (\$/a)	Total Cost (\$/a)	Production (lbs/a)	Price* (\$/lb)	Total Receipts (\$/a)	Net All Operating Costs (\$/a)
0	\$ 347	\$ 61	\$ 408	0	\$ -	\$ -	\$ (347)
1	\$ 663	\$ 197	\$ 860	0	\$ -	\$ -	\$ (663)
2 – 7	\$ 386	\$ 200	\$ 536	0	\$ -	\$ -	\$ (386)
8	\$ 1,338	\$ 526	\$ 1,864	500	\$ 2.25	\$ 1,125	\$ (739)
9	\$ 1,388	\$ 526	\$ 1,914	625	\$ 2.25	\$ 1,406	\$ (508)
10	\$ 1,437	\$ 526	\$ 1,963	750	\$ 2.25	\$ 1,687	\$ (276)
11	\$ 1,487	\$ 526	\$ 2,013	875	\$ 2.25	\$ 1,969	\$ (44)
12+	\$ 1,537	\$ 526	\$ 2,063	1000	\$ 2.25	\$ 2,250	\$ 187

Table 3. Preliminary Budget Estimate Summary for Producing Native Pecans in Oklahoma.

Year	Operating Cost (\$/a)	Fixed Cost (\$/a)	Total Cost (\$/a)	Production (lbs/a)	Price* (\$/lb)	Net All Operating Costs (\$/a)
All	\$ 926	\$ 86	\$ 1,012	700	\$ 1.10	\$ (156)

*Prices in Tables 2 and 3 reflect projected 2022 harvest prices. Historical market averages (2011-20) for Oklahoma are \$2.01 for improved and \$1.27 for native pecans.

It is important to note that this analysis assumes that maximum production was achieved and that harvested production was sold at the stated price every year the orchard is in production. Obviously, adverse weather or natural disasters that lower yields or poor market conditions that result in decreased sales will have a negative impact on the net cash flow stream and may require the farmer to secure loans or acquire additional income to cover any deficits.

Building on budgets to view sensitivity analysis is helpful in evaluating the financial risk associated with an enterprise. The improved pecan example is shown in Tables 4 and 5. With sensitivity analysis, income variability due to price and production risk is shown and helps managers assess their willingness to assume the risk of these variations.

Table 4. Sensitivity of Yield vs Price on Per Acre Net Returns Above Total Operating Costs, Improved Pecans in Oklahoma.

Yield (lbs/ac)	Price (\$/pound)				
	\$ 1.80	\$ 2.03	\$ 2.25	\$ 2.48	\$ 2.70
800	\$ (97)	\$ 83	\$ 263	\$ 443	\$ 623
900	\$ 83	\$ 285	\$ 488	\$ 690	\$ 893
1000	\$ 263	\$ 488	\$ 713	\$ 938	\$ 1,163
1100	\$ 443	\$ 690	\$ 938	\$1,185	\$ 1,433
1200	\$ 623	\$ 893	\$ 1,163	\$1,433	\$ 1,703

Table 5. Sensitivity of Yield vs Price on Per Acre Net Returns Above Total Costs, Improved Pecans in Oklahoma.

Yield (ton/ac)	Price (\$/ton)				
	\$ 1.80	\$ 2.03	\$ 2.25	\$ 2.48	\$ 2.70
800	\$ (623)	\$ (443)	\$ (263)	\$ (83)	\$ 97
900	\$ (443)	\$ (240)	\$ (38)	\$ 165	\$ 367
1000	\$ (263)	\$ (38)	\$ 187	\$ 412	\$ 637
1100	\$ (83)	\$ 165	\$ 412	\$ 660	\$ 907
1200	\$ 97	\$ 367	\$ 637	\$ 907	\$ 1,177

Summary

Budget preparation is time consuming and hard work, but it can pay major dividends. It is important to remember that “best estimates” are influenced by production and price uncertainty. Revenues losses can occur from unexpected freeze damage and other adverse weather events. It’s all a probability game since everything doesn’t always go according to plan. Identifying potential sources of risk will result in fewer unpleasant surprises.

Note that the budget illustrations are supplied for planning purposes only. Since every producer’s experience levels and managerial abilities vary as well as site location, budgets need to be tailored to fit individual situations.

Most producers enjoy the part-time lifestyle aspect of growing pecans and they are willing to support it from other income sources. However, if one desires to make a livelihood from pecan production, one had better determine the size and scale of the operation to generate the kind of net farm income sufficient to cover risk, management skills, and pay for family living. The bottom line is – make sure your operation is as cost effective as possible. And don’t settle for “average” in terms of nut quality or overall yields. Identify new technologies/cultural practices that help lower costs. Find the leverage point that can generate the most bang for the buck. Benchmark the competition. Keep accurate business records to understand if you are headed in the right direction.

Pecans may produce high rewards, but do involve high risks and require high levels of management. Successful pecan growers understand that there are no easy answers and often no simple solutions. They succeed because they are flexible and adapt. And they discover that life is a whole lot easier controlling risks and costs through budget planning. A pecan grower interested in being profitable should expect to do no less.

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