

Budget for establishing silvopasture poultry operation  
 Species Yellow Poplar  
 Country USA  
 Region/State VA Shenandoah Valley  
 Date Spring 2024

Species	Seedling Costs	Planting Labor Cost	Tree Shelter Cost	Tree Establishment Support #1	Tree Establishment Support #2	# of Trees per Acre	Total Cost per Tree	Total Cost per Acre	Acre(s)
Yellow Poplar	4.20	3.50	2.50	15.00	15.00	80.00	40.20	3215.92	1.00

In Virginia's Shenandoah Valley, poultry operations are a major part of the farm economy. Silvopasture—planting trees in areas where chickens roam and peck—could enhance the welfare of broiler chicken flocks by providing shade and more ability to exhibit natural behaviors. We recommend that poultry growers who already provide pasture access for their flocks consider establishing silvopasture settings by planting yellow poplars—also called tulip poplars—which are fast growing and thrive in regions like the Shenandoah Valley. This spreadsheet provides growers with guidance on the costs and returns of establishing yellow poplar groves as part of a silvopasture operation for poultry in the Shenandoah Valley. This spreadsheet uses cost and price estimates from various online sources. Please use these as a starting point for determining the economic feasibility of establishing yellow poplar silvopasture on your poultry operation. Users of this spreadsheet may adjust the acreage and number of trees per acre, and the cost of inputs and price received for timber.

Schedule	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Yellow Poplar	0	1	2	3	4	5	6	7	8	9	10
Growth Rate (Total height)	0.00	4.70	9.40	14.10	18.80	23.50	28.20	32.90	37.60	42.30	47.00
Thinning (Stems/Acre)	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00	40.00
Planting (Times/Year)	1					1					1
Fertilizing (Times/Year)	1				1						1
Management (Times/Year)	1	1	1	1	1	1	1	1	1	1	1

This budget shows estimates of the cost of establishing and maintaining silvopasture—for an existing pastured poultry operation—for the first ten years after establishment. Costs vary across years, and include planting, maintenance, thinning, and replanting. A critical feature of the budget is the returns from timber harvests and sales, which are based on an assumed growth rate of 4.7 feet per year. Years 0 (i.e., the initial establishment time period), 5, and 10 have significantly higher costs than the other years, because in year 0 the trees are planted, and in years 5 and 10 half of the trees—the tallest ones—are thinned and replaced. In other years, trees need only minimal management, including weeding and watering.

The section of the budget spreadsheet at left indicates the height of the tallest trees in the grove and the number of trees that will be thinned each year, with indicators for the years when trees are planted, fertilized, and managed. (Management requires some costs each year, but the highest cost in years when trees are thinned.)

	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Yearly Costs (\$/Year)	0	1	2	3	4	5	6	7	8	9	10
Site Preparation	\$1,400.00					\$700.00					\$700.00
Planting	\$615.92					\$307.96					\$307.96
Fertilizing	\$240.00					\$120.00					\$120.00
Management (Employees)	\$75.00	40.00	\$40.00	\$40.00	\$40.00	\$500.00	\$40.00	\$40.00	\$40.00	\$40.00	\$500.00
Total Costs (\$/Year)	\$2,330.92	\$40.00	\$40.00	\$40.00	\$40.00	\$1,627.96	\$40.00	\$40.00	\$40.00	\$40.00	\$1,627.96

The section of the spreadsheet at left shows the yearly costs of site preparation, planting, fertilizing, and management based on the schedule outlined above.

This is the total cost line, which sums all costs shown in the section above.

	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Tree Income (\$/Year)	0	1	2	3	4	5	6	7	8	9	10
Thinning Timber (\$/Year)						\$2,350.00					\$4,700.00

The green table shows expected income from thinning the trees. Producers need to consider their income from chicken separately; this spreadsheet tool is designed to help evaluate the feasibility of adding silvopasture to an existing operation. The income is based on tree growth and thinning based on regional, average timber prices for Yellow Poplars. These numbers are not exact, and subject to change based on market forces.

Cash Flow Chart	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Inflows	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,350.00	\$ -	\$ -	\$ -	\$ -	\$ 4,700.00
Outflows	\$ 2,330.92	\$ 40.00	\$ 40.00	\$ 40.00	\$ 40.00	\$ 1,627.96	\$ 40.00	\$ 40.00	\$ 40.00	\$ 40.00	\$ 1,627.96
Total Difference	\$ (2,330.92)	\$ (40.00)	\$ (40.00)	\$ (40.00)	\$ (40.00)	\$ 722.04	\$ (40.00)	\$ (40.00)	\$ (40.00)	\$ (40.00)	\$ 3,072.04

The orange table is representative of all cash outflows and inflows that are relative to a chicken silvopasture. Inflows and outflows are taken from the income table in green, and the cost table in blue. As a reminder, this partial budget only reflects the changes in cash flows from the silvopasture part of the operation.

Net present value of establishing silvopasture under various discount rate assumptions				
Discount rate	0%	4%	8%	12%
NPV	\$ 1,143.16	\$ 73.37	\$ (639.21)	\$ (1,122.53)

The gray table presents calculations of the net present value of establishing silvopasture and harvesting timber from the established silvopasture. Because revenues only generated in years 5 and 10, a one-acre silvopasture operation can only be expected to be economically profitable if discount rates are low—below about 4.4%. However, the next tab shows that establishment of larger silvopasture parcels is more profitable because there are some efficiency gains for larger acreage.

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Species	Seedling Costs	Planting Labor Cost	Tree Shelter Cost	Tree Establishment Support #1	Tree Establishment Support #2	# of Trees per Acre	Total Cost per Tree	Total Cost per Acre	Acre(s)
Yellow Poplar	4.20	3.50	2.50	3.50	3.50	80.00	17.20	1375.92	10.00

We assume that when producers establish larger acreage of silvopasture, they will benefit from cost savings. In this example, a 10-acre parcel of silvopasture can be planted for \$17.20 per tree, or \$1,376 per acre, whereas for a one-acre parcel, the cost is \$40.20 per tree, or \$3,216 per acre.

Schedule	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Yellow Poplar	0	1	2	3	4	5	6	7	8	9	10
Growth Rate (Feet/Year)	0.00	4.70	9.40	14.10	18.80	23.50	28.20	32.90	37.60	42.30	47.00
Thinning (Stems/Acre)	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00	40.00
Planting (Times/Year)	1					1					1
Fertilizing (Times/Year)	1					1					1
Management (Times/Year)	1	1	1	1	1	1	1	1	1	1	1

	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Yearly Costs (\$/Acre/Year)	1	2	3	4	5	6	7	8	9	10	
Site Preparation	\$480.00				\$240.00						\$240.00
Planting	\$615.92				\$307.96						\$307.96
Fertilizing	\$240.00				\$120.00						\$120.00
Management	\$75.00	\$40.00	\$40.00	\$40.00	\$40.00	\$500.00	\$40.00	\$40.00	\$40.00	\$40.00	\$500.00

Total Costs (\$/Acre/Year)	\$1,410.92	\$0.00	\$40.00	\$40.00	\$40.00	\$1,167.96	\$40.00	\$40.00	\$40.00	\$40.00	\$1,167.96
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	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
Tree Income (\$/Acre/Year)	1	2	3	4	5	6	7	8	9	10	
Thinning Timber (\$/Acre/Year)					\$2,350.00						\$4,700.00

Cash Flow Chart	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
	1	1	2	3	4	5	6	7	8	9	10
Inflows	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,500.00	\$ -	\$ -	\$ -	\$ -	\$ 47,000.00
Outflows	\$ 14,109.20	\$ -	\$ 400.00	\$ 400.00	\$ 400.00	\$ 11,679.60	\$ 400.00	\$ 400.00	\$ 400.00	\$ 400.00	\$ 11,679.60
Total Difference	\$ (14,109.20)	\$ -	\$ (400.00)	\$ (400.00)	\$ (400.00)	\$ 11,820.40	\$ (400.00)	\$ (400.00)	\$ (400.00)	\$ (400.00)	\$ 35,320.40

Net present value of establishing silvopasture under various discount rate assumptions				
Discount rate	0%	4%	8%	12%
NPV	\$ 30,231.60	\$ 17,206.76	\$ 8,439.59	\$ 2,423.05

The net present value calculations at left show that, under this set of assumptions, a 10-acre parcel of silvopasture is profitable even at relatively high discount rates. These economic benefits are modest, but harvesting timber allows producers to value to land that would otherwise not be economically productive. Producers should also keep in mind that they may be able to market their poultry as silvopasture-raised, potentially increasing the price received for their poultry.