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Purdue *HortCalculator*: A Financial Tool for Specialty Crop Growers

Introduction

Specialty crop growers often face uncertainty when planning and investing in their operations. High-value crops such as spinach are popular in direct and wholesale markets, yet production involves risks from pests, labor and fluctuating prices. Farmers who use high tunnels to extend the spinach season must decide if investments in pest control or new practices will pay off. Making these decisions without financial tools can leave farmers guessing about costs and returns.

To address this challenge, Ariana Torres, associate professor of horticulture economics at Purdue University, developed the *HortCalculator*, a free, web-based tool that helps farmers evaluate the financial side of spinach production in high tunnels. The calculator provides easy-to-read financial reports, including total costs, profitability, break-even analyses and sensitivity tests. The tool also allows farmers to compare conventional pest management with biological control strategies, giving them the ability to weigh costs and benefits before adopting new practices.

Why Financial Tools Matter

Financial decision-making tools give farmers a way to connect production choices with economic outcomes. Enterprise budgets, cost breakdowns and profitability analyses have long been used in corn and soybean commodity systems. Moreover, most existing tools are designed for large farms and do not capture the realities of small- and medium-scale specialty crop operations. The *HortCalculator* fills this gap by tailoring financial analysis to specialty crop, using real farm data and practices. We first tailored the *HortCalculator* to understand the economic feasibility of spinach production under high tunnels. We are working with farmers to add more specialty crops to the tool next year.

Recordkeeping is key to making these tools useful. Farmers who keep track of inputs, labor, and sales are better positioned to evaluate profitability and risk. By encouraging growers to enter farm-specific data, the *HortCalculator* not only generates financial reports but also supports stronger recordkeeping habits that benefit farm planning.

A Farmer's Story: Using the *HortCalculator* in Practice

When a small-scale grower in Indiana expanded her high tunnel production to include spinach, she wanted to be sure the crop would contribute positively to her bottom line. She had years of experience selling through Community Supported Agriculture (CSA) and farmers markets, but she was unsure how much her labor, inputs, and overhead were really costing her. "I knew I was making some money, but I couldn't tell if I was covering all my costs," she explained.

The grower used the *HortCalculator* to enter her farm's production numbers, labor hours and sales data. Within minutes, the tool produced a report showing her total costs and net profit. The report also highlighted how much she needed to sell per pound of spinach to break even. "It was eye-opening," she said: "I realized that even though my prices looked good, my labor was eating up more profit than I expected."

She also used the tool's sensitivity analysis to test what would happen with her net profit if her yields dropped or if market prices changed. This gave her the confidence to adjust her CSA pricing and plan for different scenarios. Finally, the grower explored the biological control comparison to see if adding biological agents would make sense financially. The tool showed that in her case, investing in lacewings could reduce pest losses and increase her net profit.

The grower now plans to use the *HortCalculator* every season to check her numbers before planting and to evaluate new investments. "It's become part of how I plan," she said. "I can make decisions based on data instead of guessing, and that gives me peace of mind."

What the *HortCalculator* Provides

The *HortCalculator* transforms farmer-entered data into financial reports. These reports include:

- Cost Analysis: Breaks down variable, labor, fixed and overhead costs, shown as totals and per square foot ($/sq. ft.).
- Profitability Analysis: Estimates gross revenue, total costs and projected net profit under conventional and biological control scenarios.
- Sensitivity Analysis: Projects profitability under different yield and price conditions (+/- 30%), helping farmers test "what-if" situations.
- Break-Even Analysis: Calculates the minimum price or yield needed to cover production costs.
- Investment Indicators: Provides return on investment (ROI) and marginal benefit-cost ratio (MBCR) when comparing pest management strategies.
- These outputs allow farmers to understand where money is being spent, identify profit margins, and evaluate the risks and rewards of new practices.

How to Use the *HortCalculator*: Step-by-Step Guide

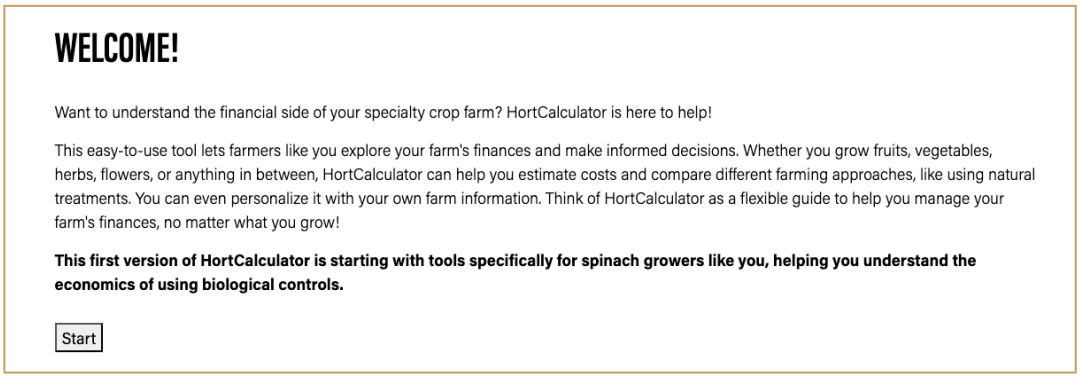
Before you start: Gather your numbers

You'll move faster if you have some records handy. Collect your spinach yield (in pounds), the square feet planted in high tunnels, planting and harvest dates, sales prices by channel, input purchases (quantity and cost), labor hours by task, equipment purchases with years of use, and overhead expenses like utilities, insurance, or marketing. The tool now looks at ***one crop cycle of spinach at a time*** (from planting to last harvest), which keeps the analysis specific and useful.

> ***Where to find this info:***
>
> *harvest logs, CSA/market sheets, invoices/ receipts, QuickBooks, payroll/wage notes, and last year's bills or Schedule F.*

Step 1 — Start the Tool.

Go to hortcalc.ceris.purdue.edu and click Start. The tool will guide you through short, simple questions. You can create a personal code to save your work and return later, keep it with your farm records.



Step 2 — Enter Production Data (your spinach cycle).

Type in your farm size, your total high tunnel space, and the square feet used for spinach in this cycle. Then add the planting and last harvest dates, plus the total marketable spinach yield in pounds. The tool automatically checks that your spinach area doesn't exceed your tunnel space and that your dates make sense.

Step 3 — Add Farm Revenue and Wage Rates (to price your labor correctly).

Enter your farm's total gross revenue from all crops and products. Then type in the hourly wages you pay full-time, part-time, and machine operators. These wages are used to calculate the true cost of labor for spinach.

Step 4 — Record Sales by Market Channel.

Choose your sales outlets (CSA, farmers market, restaurants, retailers, online or at-farm sales). For each channel, enter the percent of spinach sold and the average price per pound. The shares must add up to 100%. The tool then calculates a weighted average price for you.

Tip:

If your sales logs are in bunches or bags, convert to pounds before you enter prices and volumes

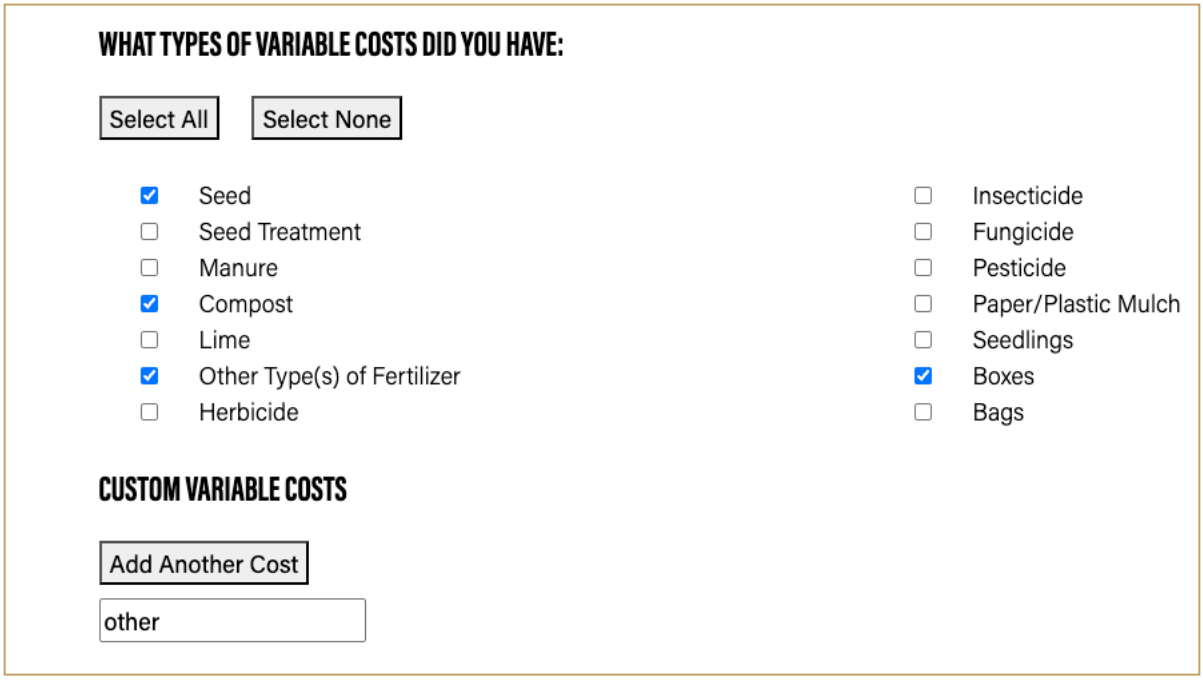
Step 5 — List Variable Costs (inputs tied to production volume).

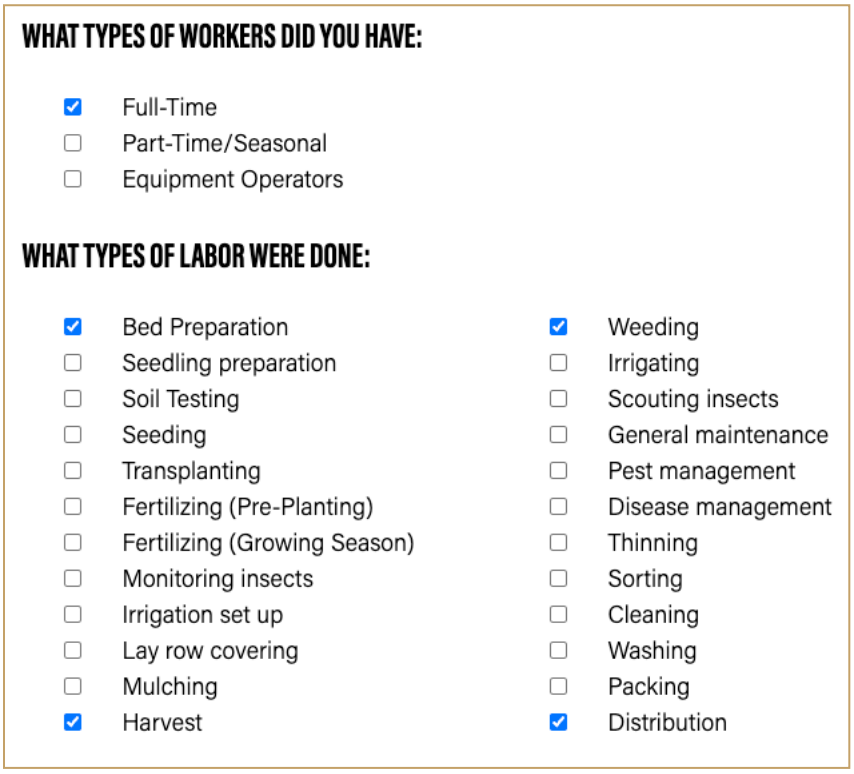
Add the inputs you used for spinach, such as seeds, compost, fertilizer, mulch, or packaging. For each item, enter the quantity, unit, and price per unit. You can add your own items if something is not on the list. The tool totals your input costs and shows them per square foot so you can compare across beds or cycles.

The tool totals each input (price × quantity) and then totals across inputs; it also shows results per square foot so you can compare cycles or beds later.

Step 6 — Add Labor Hours (hours for this cycle of spinach).

Record the hours you and your workers spent on spinach. Break them down into three stages: pre-planting (soil prep, transplanting, irrigation setup), growing (weeding, irrigation, pest scouting, harvesting), and post-harvest (washing, grading, packing, storage). Assign hours to full-time, part-time, or machine operators, and use decimals for minutes (e.g., 0.5 for 30 minutes). Do not forget unpaid family labor, your time counts too. The tool calculates total labor cost and shows it per square foot.





WHAT TYPES OF WORKERS DID YOU HAVE:

- [x] Full-Time
- [ ] Part-Time/Seasonal
- [ ] Equipment Operators

WHAT TYPES OF LABOR WERE DONE:

[x]	Bed Preparation	[x]	Weeding
[ ]	Seedling preparation	[ ]	Irrigating
[ ]	Soil Testing	[ ]	Scouting insects
[ ]	Seeding	[ ]	General maintenance
[ ]	Transplanting	[ ]	Pest management
[ ]	Fertilizing (Pre-Planting)	[ ]	Disease management
[ ]	Fertilizing (Growing Season)	[ ]	Thinning
[ ]	Monitoring insects	[ ]	Sorting
[ ]	Irrigation set up	[ ]	Cleaning
[ ]	Lay row covering	[ ]	Washing
[ ]	Mulching	[ ]	Packing
[x]	Harvest	[x]	Distribution

*The tool multiplies **time × wage** by worker type, sums across activities, and scales per square foot so you can compare over time.*

Step 7 — Add Equipment & Machinery (so depreciation is priced in).

Think about the tools and structures you use to grow and sell spinach, such as high tunnels, irrigation system, seeder, or cooling equipment. For each one, enter the purchase price, how many years you expect it to last and the yearly maintenance cost.

The *HortCalculator* does the math for you. It spreads the cost of each item over its useful life and assigns only the share that spinach used during this crop cycle. That way, your spinach "pays rent" for its portion of the tunnel or equipment instead of carrying the whole bill.

This step is important because it shows the hidden costs of your investments. Farmers often focus on seeds and labor, but forgetting equipment costs can make a crop look more profitable than it really is. By including your machinery, you will see the full picture and make better decisions about future purchases.

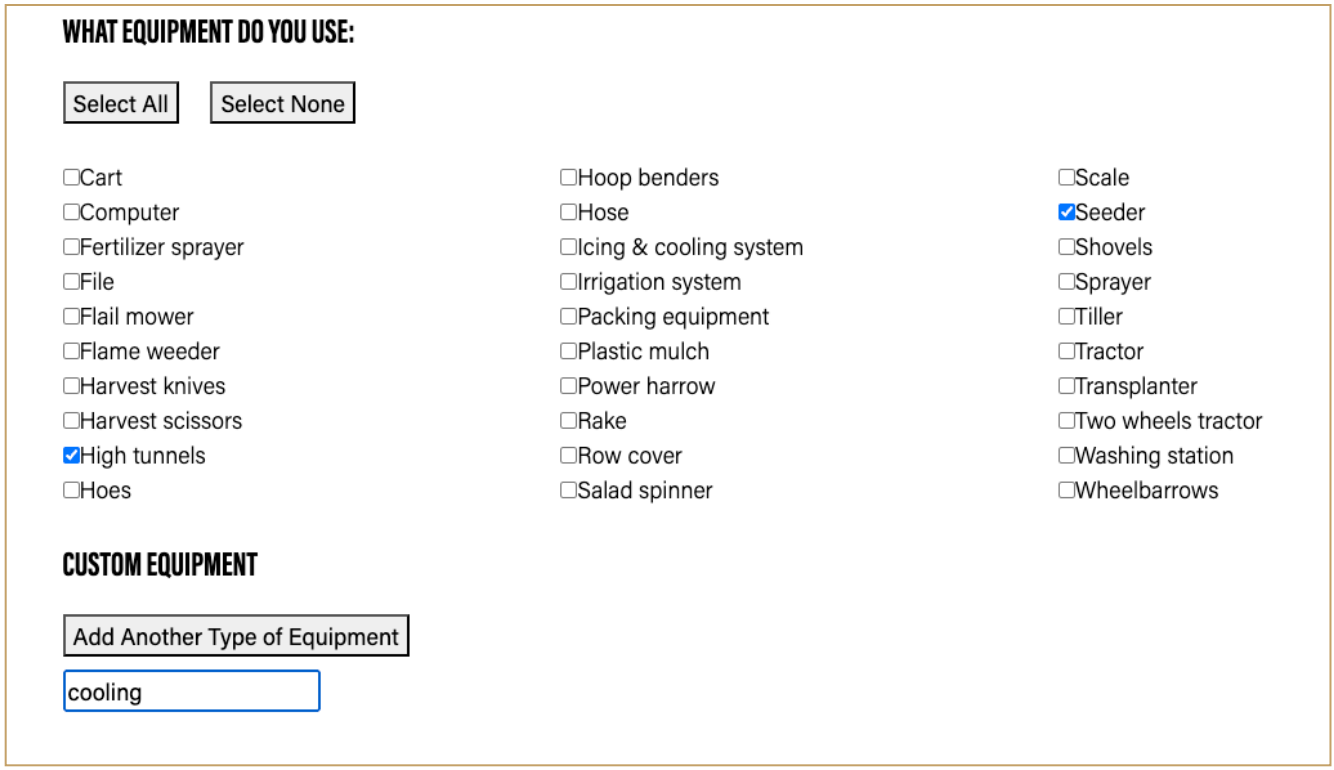
Step 8 — Enter Overhead Expenses (annual, for the whole farm).

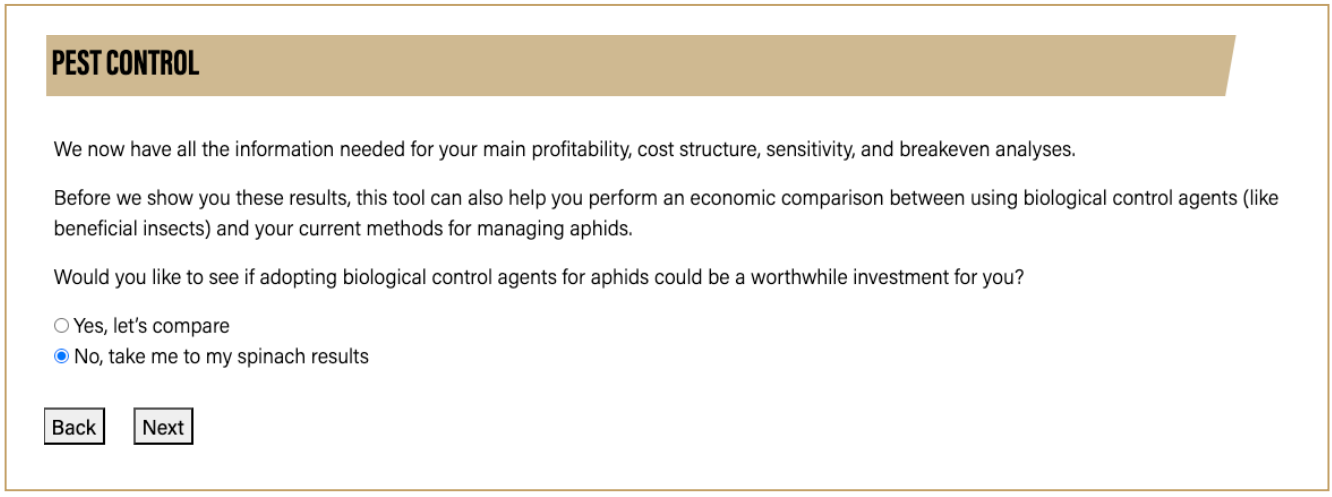
Add your annual farm overhead, which are things like utilities, insurance, property taxes, phone, office supplies, transportation or marketing. If you don't have an expense, just enter zero. The tool allocates a fair share of these costs to spinach based on tunnel space or revenue share. This way, higher-earning crops carry their part of the overhead.

Step 9 — (Optional) Pest Control with Biological Control Agents (BCAs)

If you want to evaluate pest management with beneficial insects, you can either:

1. Enter your own data (species, quantity, price, shipping, labor hours for release and monitoring, and crop loss before and after release), or
2. Use Purdue's preloaded trial data for lady beetles, lacewings or minute pirate bugs.
   The tool lets you analyze one biological control at a time so results stay simple and clear.



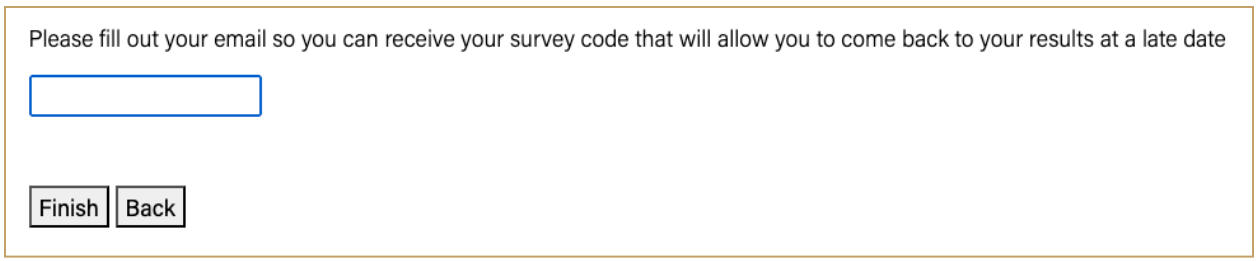


Step 10 — Provide your email address to access your financial reports

Once all your data is entered, click through to results. You can download or email the reports in PDF. You will receive:

- **Cost Analysis:** Your costs broken down by inputs, labor, equipment and overhead.
- **Profitability:** Your total revenue, costs and net profit, with a comparison between conventional and biological control if you entered BCA data.
- **Sensitivity Analysis:** "What-if" scenarios that test your profit if yields or prices change by ±30%.
- **Break-Even Analysis:** The price and yield you need to cover your costs.
- **Investment Indicators:** ROI and MBCR for biological controls, showing if the benefits outweigh the costs.

Each report includes charts and notes to make the results easier to interpret.



Step 11 — Save your Code, Compare, and Revisit.

Use your personal code to come back later and update numbers. You can compare different crops, technologies, or conventional versus biological control systems without retyping all your data. Because the tool standardizes results to per-square-foot costs for one crop cycle, you can compare apples to apples across seasons.

Confidentiality: *The* HortCalculator *does not collect your information for any purpose other than performing the calculations. Your information is not connected to any tariff agencies, government institutions or outside organizations, and your data will never be shared. All information is stored securely on Purdue University's cloud system.*

A Quick Case Study of a Farm in Indiana

Farm Sunnyside is an 8-acre diversified vegetable farm in peri-urban central Indiana. The farm operates eight high tunnels totaling 15,840 square feet, producing tomatoes, cucumbers, zucchini, carrots, lettuce, arugula, kale, peppers, onions, cabbage, radishes and spinach. In the 2024 winter/spring cycle, the team devoted 860 square feet of high-tunnel space to spinach. Planting took place on March 12, 2024, and the final harvest occurred on Jan. 18, 2025, yielding 310 pounds of marketable spinach. The farm follows organic practices to ensure product quality, traceability and access to differentiated markets. Below is the data entered into the *HortCalculator* and the reports generated.

General Farm Information

- Total farm area: 8 acres
- High tunnel area (all crops): 15,840 sq. ft.
- Spinach-planted area (this cycle): 860 sq. ft.
- Yield (this cycle): 310 lbs.
- Annual gross farm revenue: $101,124
- Hourly wages:
  - Full-time employees: $19.50/hour
  - Part-time employees: $17.50/hour
  - Machine operators: $19.50/hour

Sales (Spinach)

- CSA program: 60% of sales, $14.00/lb.
- Farmers market: 20% of sales, $14.00/lb.
- On-farm sales: 20% of sales, $12.00/lb.
- Other channels (restaurants, retailers, online): None

Variable Costs

- Seeds: $18
- Compost: $250
- Fertilizer: $25
- Packaging: $75
- Other inputs: $60
- Total variable costs: $428

Labor Usage (Spinach Cycle Only)

- Pre-planting: 6 hours (soil prep, transplanting, irrigation setup)
- Growing season: 5 hours (weeding, irrigation, scouting)
- Harvest: 10 hours
- Post-harvest: 3.5 hours (washing, sorting, packing, storage)
- Total labor hours: 24.5

Equipment and Machinery

- High tunnels: $24,000 purchase price, 10-year life, $500 annual maintenance
- Cooling system: $2,600 purchase price, 10-year life, $100 annual maintenance
- Seeder and hand tools: $1,200 purchase price, 10-year life, $50 annual maintenance

Overhead Costs (Annual)

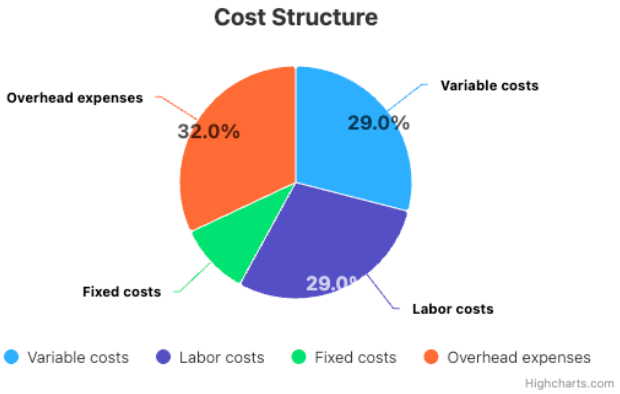
- Mortgage/property taxes: $12,000
- Transportation: $3,500
- Marketing: $1,523
- Insurance and utilities: $2,200
- Office/phone/software: $800
- Total overhead: $20,023

Case Study Reports / in Total Costs chart – "Cost per sq. ft."

COST ANALYSES [HIDE]

TOTAL COSTS

	Total spinach value ($)	Cost per ft^2
Variable costs	$478.00	$0.56
Labor costs	$477.75	$0.56
Fixed costs	$159.18	$0.19
Overhead expenses	$517.22	$0.60
Total costs	**$1,632.16**	**$1.90**



NET PROFIT ANALYSIS [HIDE]

PROJECTED PROFITS

Net Profit Analysis		
Finacial Results	**Total Spinach ($)**	**Spinach per area ($/ft^2)**
Direct to consumer sales	$1,686.40	$1.96
Non-direct to consumer sales	$0.00	$0.00
Gross Revenue	$1,686.40	$1.96
Total costs	$1,632.16	$1.90
Projected net profit	**$54.24**	**$0.06**

The projected net profits for the total cycle are $54, with a net profit per sq. ft at $0.06/sq. ft.

How Farmers Benefit from the *HortCalculator*

The *HortCalculator* provides farmers with a clear and practical way to connect their production decisions with financial outcomes. By entering their own farm data, growers can see exactly where their money is going and how different choices affect profitability. This analysis helps farmers better understand the true cost of producing spinach in high tunnels and evaluate whether their prices cover expenses.

One of the most useful features of the tool is its ability to calculate breakeven points, allowing farmers to know the minimum yield or price needed to avoid losses. With this information, growers can set realistic sales goals and make better-informed marketing decisions.

Another key benefit of the *HortCalculator* is its ability to run "what-if" scenarios. Farmers can test how changes in yield, market price, or input costs will influence their bottom line. For example, the tool can show how a 30% drop in yield or a 20% increase in price would affect net profit. This sensitivity analysis helps farmers prepare for risk, make contingency plans and reduce financial surprises. It also supports decision-making about investments, such as adopting biological controls for pest management. By comparing conventional systems with those that use beneficial insects, the tool shows whether new practices improve profitability.

Beyond financial planning, the *HortCalculator* encourages better recordkeeping. Entering data into the tool requires information about inputs, labor, and sales, which can motivate farmers to track their operations more consistently. This improved recordkeeping not only strengthens farm management but also provides documentation that can be valuable when applying for loans, cost-share programs or grants. Lenders and policymakers often ask for financial records, and having detailed reports from the *HortCalculator* can make farmers more competitive in securing support.

Finally, the *HortCalculator* is farmer-friendly and free to use. Its online format means growers do not need to build complex spreadsheets or hire outside consultants to understand their farm finances. The tool is designed with specialty crop farmers in mind, making it directly relevant to small- and medium-scale operations. By offering clarity, flexibility and practical insights, the *HortCalculator* equips farmers with the information they need to make confident decisions that support the profitability and long-term sustainability of their operations.

SENSITIVITY ANALYSIS [HIDE]

Sensitivity analysis compares how net profit changes when price and yield fluctuate between -30% and 30%

SENSITIVITY ANALYSIS								
		-30%	-20%	-10%	Price	10%	20%	30%
		$9.52	$10.88	$12.24	$13.60	$14.96	$16.32	$17.68
-30%	217	$434	$729	$1,024	$1,319	$1,614	$1,909	$2,204
-20%	248	$729	$1,066	$1,403	$1,741	$2,078	$2,415	$2,752
-10%	279	$1,024	$1,403	$1,783	$2,162	$2,542	$2,921	$3,301
Yield	310	$1,319	$1,741	$2,162	$2,584	$3,005	$3,427	$3,849
10%	341	$1,614	$2,078	$2,542	$3,005	$3,469	$3,933	$4,397
20%	372	$1,909	$2,415	$2,921	$3,427	$3,933	$4,439	$4,945
30%	403	$2,204	$2,752	$3,301	$3,849	$4,397	$4,945	$5,493

Think of sensitivity analysis as checking how 'sensitive' your profit is to changes in yield and the average weighted price across all your markets.

For example, will a small dip in price cause a big drop in profit, or just a small one? This tool calculates how your farm's profit could go up or down when you test different selling prices and crop yield amounts.

Hover your mouse over any cell in the table to see an explanation of that particular price and yield outcome.

BREAKEVEN YIELD ANALYSES (BE) [HIDE]

Breakeven for yield and price compares what is the minimum yield and price in order to cover costs.

BREAKEVEN YIELD ANALYSIS								
		-30%	-20%	-10%	Price	10%	20%	30%
		$9.52	$10.88	$12.24	$13.60	$14.96	$16.32	$17.68
-30%	$1,142.51	120	105	93	84	76	70	65
-20%	$1,305.72	137	120	107	96	87	80	74
-10%	$1,468.94	154	135	120	108	98	90	83
Cost	$1,632.16	171	150	133	120	109	100	92
10%	$1,795.37	189	165	147	132	120	110	102
20%	$1,958.59	206	180	160	144	131	120	111
30%	$2,121.80	223	195	173	156	142	130	120

Breakeven analysis helps you figure out the exact point where your income from sales perfectly covers all your farming costs.

This report shows you the minimum yield you need to get for your crop, or the minimum yield you need from your fields, just to reach that 'break-even' point where you're not losing money (but not yet making a profit).

Hover your mouse over any breakeven figure in the report to get a quick explanation of what that specific price and yield combination means for covering your costs.

BREAKEVEN PRICE ANALYSES (BE) [HIDE]

BREAKEVEN PRICE ANALYSIS								
		-30%	-20%	-10%	Yield	10%	20%	30%
		217	248	279	310	341	372	403
-30%	$1,142.51	$5.27	$4.61	$4.10	$3.69	$3.35	$3.07	$2.84
-20%	$1,305.72	$6.02	$5.27	$4.68	$4.21	$3.83	$3.51	$3.24
-10%	$1,468.94	$6.77	$5.92	$5.27	$4.74	$4.31	$3.95	$3.65
Cost	$1,632.16	$7.52	$6.58	$5.85	$5.27	$4.79	$4.39	$4.05
10%	$1,795.37	$8.27	$7.24	$6.44	$5.79	$5.27	$4.83	$4.46
20%	$1,958.59	$9.03	$7.90	$7.02	$6.32	$5.74	$5.27	$4.86
30%	$2,121.80	$9.78	$8.56	$7.61	$6.84	$6.22	$5.70	$5.27

Breakeven analysis helps you figure out the exact point where your income from sales perfectly covers all your farming costs.

This report shows you the minimum price you need to get for your crop, or the minimum yield you need from your fields, just to reach that 'break-even' point where you're not losing money (but not yet making a profit).

Hover your mouse over any breakeven figure in the report to get a quick explanation of what that specific price and yield combination means for covering your costs.

Tips for Smooth Entry

- Always enter yield and price in pounds.
- Sales shares must equal 100%.
- Use decimals for minutes (0.5 = 30 minutes).
- The tool checks for common mistakes (area, dates, missing fields).

Summary

The *HortCalculator* is more than a budgeting tool, it is a resource for building stronger, more resilient farms. By connecting production data to financial outcomes, the tool helps farmers manage risk, make informed decisions and evaluate investments. For spinach growers in high tunnels, it provides a practical way to test profitability under different production practices and market conditions. Farmers can access the tool for free at hortcalc.ceris.purdue.edu.

Acknowledgments

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