

Before you enter new markets: Crops

Understanding your costs and break-even point



Cost of production and break-even points are terms business and financial advisors often refer to, but what do they actually mean? How do they relate to my farm business? And better yet, why are they even important? By knowing how much it costs to make your farm product, you can be more confident in the price you need to create a profit. This can help decide which markets available to you are most profitable and worth your time to enter, especially if production capacity is limited. Most of these decisions will be made early in the season, prior to the crop ever being planted or raised.

Estimating your cost of production

Cost of production can be broken down into two categories: direct costs and indirect costs. In agriculture, direct costs are the Cost of Goods Sold, or how much it costs to produce a unit of crop, from planting to delivery. This will include seeds, material costs, fuel, and labor. Cost of Goods Sold can be broken down into a per unit cost in three areas:

- Planting and Growth,
- Harvest, and
- Packaging/Delivery.

A Production Unit could be 100' long rows or acres. In this portion of cost estimation, any applicable equipment costs will be the direct cost to run the equipment. The University of Kentucky releases a great tool, *Custom Machinery Rates Applicable to Kentucky* each year.

<https://agecon.ca.uky.edu/files/customratesky.pdf>

Planting and Growth:

What land preparation is necessary to plant the crop? This could be soil prep, plowing, disking, fertilization, or laying plastic mulch. What does it cost to plant the crop? This includes seed or transplant costs, labor to plant, and equipment/fuel costs (if applicable). Then what costs are associated with the crop growing until harvest? This includes chemical and mechanical weed control, staking a crop, irrigation, insecticides, fungicides, and any in-season fertilization.

Description	Unit needed	Unit	Cost per Unit	Total P&G Cost
<i>Example: transplants</i>	50	Plants	\$0.40	\$
Plant & Growth Total				\$

Harvest:

What is involved in harvesting this crop? Does harvest require a piece of equipment to run through the field, covering so many acres per hour? Or is harvest done manually and measured in pounds of produce picked per hour? Some crops may require a combination of the two. There may also be post-harvest work to prepare the field for the next crop, such as removing irrigation equipment or plastic mulch.

Description	Unit needed	Unit	Cost per unit	Total Harvest Cost
<i>Example: Harvest</i>	<i>2.22</i>	<i>Hour</i>	<i>\$10.00</i>	<i>\$22.20</i>
Harvest Total				\$

Packaging/Delivery:

How does your customer expect the crop delivered? This will dictate packaging and delivery. It may be necessary to sort a crop by color and/or size prior to placing in a 25-pound or 1 1/9-bushel box. The customer may expect the box to be delivered to a certain location two times per week. There will be packaging and delivery labor associated with that, as well as packaging supplies, and potentially packaging & delivery equipment. Other customers may be fine with loading bulk material into a semi and delivering it as needed. Packaging may not be needed here, but equipment to load, deliver and unload may be, as well as the time to do so.

Description	Unit Needed	Unit	Cost per Unit	Total P& D Cost
<i>Example: Boxes</i>	<i>15</i>	<i>Boxes</i>	<i>\$2.00</i>	<i>\$30.00</i>
Packaging/Delivery Total				\$

Total Direct Cost (or Cost of Goods Sold) will be calculated by adding up the totals from 'Planting and Growth', 'Harvest', and 'Packaging/Delivery'.

Plant & Growth Total	\$
Harvest Total	\$
Packaging/Delivery Total	\$
Total Direct Costs	\$

Understanding Indirect Costs

The next step is to figure any Indirect costs. These are often referred to as “Fixed costs” or “Overhead”. This expense would include costs the business incurs regardless of what is produced. This would be management labor, property taxes, machinery & equipment, insurance, repair & maintenance, office expense/utilities, and licenses & permits.

Two additional costs are interest expense and depreciation. Interest expenses reflect the cost of borrowing money for operating capital, equipment and/or facilities, and land. Interest attributed to these categories is broken down based on the repayment schedule from the lender, or amortization. This could be paid monthly, quarterly, or annually. Amortization tables can be found online or from your lender to correctly account for interest expenses. <https://www.amortization-calc.com/>

Wear and tear on equipment will see a reduction in its value over time, even if it is paid for in full; calculating depreciation captures that cost. First consider the useful life of the product, how long do you expect it to last on your farm? Then determine a salvage value, or what it would be worth at the end of the useful life. Depreciation is the purchase price subtracted by the salvage life, then divided by the useful life.

Description	Total Expense	Production Unit Used	Total Units	Amount/Unit
<i>Example: Property Taxes</i>	<i>\$500.00</i>	<i>1 (100' row)</i>	<i>5 rows</i>	<i>\$100.00</i>
Indirect Cost Total				\$

Direct and indirect expenses added together will provide the total cost of production, based on the area of production.

Breaking Even and Pricing

One more step is required to get to the break-even price. You will need to know expected yield based on the production area from all the work above. This could be pounds per 100' row or bushels per acre. In either case, just make sure the yield is in line with the unit of area used.

Breakeven Price = (Direct Cost + Indirect Cost)/Yield

If the farm produces multiple crops, the Indirect Costs should be allocated among each crop accordingly. The percentage of Indirect Cost attributed can be based off unit of area for each crop produced. For example, if you have two 100' rows of tomatoes, two 100' rows of peppers, and one 100' row of potatoes, indirect costs would be 2/5 to tomatoes; 2/5 to peppers; and 1/5 to potatoes. Direct costs and yield will need to be calculated for each crop individually and added to the table below to determine the break even price for each crop.

Example: Break Even Price Calculation

<i>Crop</i>	<i>Direct Costs</i>	<i>Indirect Costs</i>	<i>Yield</i>	<i>Breakeven Price</i>
Tomatoes	\$277.36	\$310.00	300	\$1.96

Crop	Direct Cost	Indirect Cost (divided among the crops)	Yield (unit)	Break Even Price
	\$	\$		\$

Determining the cost of production and breakeven price is a good decision-making practice. As mentioned above, indirect costs may be split over several enterprises (tomatoes, peppers, potatoes, etc).

Determining costs and break-even points should be done for each enterprise on your farm. Break-even points become more involved as you change packaging and distribution to reach new markets. In each case, the labor associated with different packaging and distribution to accommodate markets; as well as the cost of market packaging and travel costs will change your break-even price for those markets. You can then see if the price offered at new and existing markets will allow you to be profitable, which requires that the price be above the break-even point calculated above.

Additional Resources

For more information on crop specific enterprise budgets (include cost of production figures, as well as gross returns based on yield and price), check out the links below.

For vegetable and specialty crops:

- The University of Kentucky Center for Crop Diversification
<https://www.uky.edu/ccd/tools/budgets>
- For corn, soybean, wheat, tobacco, and livestock:
University of Kentucky College of Agriculture, Food and Environment Agricultural Economics
Budgets and Decision Tools
<http://agecon.ca.uky.edu/budgets>

KCARD is available to help pinpoint the breakeven price corresponding to crops and markets. Give us a call at 859-550-3972 or contact us via email using kcard@kcard.info

Example:

One 100' row of tomatoes, yielding 300 pounds and being sold at a farmer's market.

Where applicable, expenses will be divided based on a plot size of five 100' rows.

The operation's tomato enterprise has no debt associated with it.

Direct Costs

Planting and Growth

Description	Units Needed	Unit	\$/Unit	Total
Plants	50	plants	\$ 0.40	\$ 20.00
Transplant & Staking Labor	1.5	hours	\$ 12.50	\$ 18.75
N Fertilizer: Preplant Urea	1.25	lbs	\$ 0.40	\$ 0.50
Starter Liquid Fertilizer	0.1125	lbs	\$ 3.00	\$ 0.34
N Fertilizer: Calcium Nitrate fertigation	7.5	lbs	\$ 0.45	\$ 3.38
Black Plastic/Drip Lines	100	feet	\$ 0.08	\$ 8.00
Stakes & Twine	1	plot	\$ 27.50	\$ 27.50
Weed Control	1	plot	\$ 6.79	\$ 6.79
Insect Control	1	plot	\$ 3.31	\$ 3.31
Disease Control	1	plot	\$ 9.00	\$ 9.00
Irrigation	1.125	hrs.	\$ 0.40	\$ 0.45
Machinery Variable Costs	1	plot	\$ 1.16	\$ 1.16
Planting & Growth Total				\$ 99.16

Harvest

Description	Units Needed	Unit	\$/Unit	Total
Harvest Labor	2.22	hours	\$ 10.00	\$ 22.20
Harvest Buckets	2	each	\$ 8.00	\$ 16.00
Plastic Disposal	0.5	hours	\$ 10.00	\$ 5.00
Harvest Total				\$ 43.20

Packaging/Delivery

Description	Units Needed	Unit	\$/Unit	Total
Boxes	15	boxes	\$ 2.00	\$ 30.00
Grade/Pack Labor	7.2	hours	\$ 10.00	\$ 72.50
Hauling to Market Costs	60	miles	\$ 0.55	\$ 33.00
Packaging & Delivery Total				\$135.00

Depreciation Costs

Description	Purchase Price	Salvage Price	Useful Life	Depr Expense
Walk Behind Tractor	\$ 1,500.00	\$800.00	10	\$ 70.00
Irrigation System	\$ 350.00	\$ 50.00	10	\$ 30.00
Walk Behind Tractor Attachments	\$ 1,500.00	\$500.00	10	\$100.00
Annual Depreciation Total				\$200.00

Indirect Costs

Description	Total Expense	Rows Grown	Total Rows	Total
Equipment Depreciation				
Walk behind tractor	\$ 70.00	1	5	\$ 14.00
Irrigation System	\$ 30.00	1	5	\$ 6.00
Walk Behind Tractor Attachments	\$ 100.00	1	5	\$ 20.00
Property Taxes	\$ 500.00	1	5	\$100.00
Insurance	\$ 350.00	1	5	\$ 70.00
Farm Market Fees	\$ 500.00	1	5	\$100.00
Indirect Costs Total				\$310.00