Adapting Enterprise Budgets for Organic Crops

Deciding what organic products to grow and how to price them is difficult, particularly when markets often are not well established.

Prices need to be high enough to generate a profit, but reasonable based on a producer's competition and how customers value (or establish a price on) the product. However, while all three components of pricing (cost, competition, and customer) need to be taken into consideration, cost is the most important. Why? Because if a producer is not making a profit on the organic products being sold, the business is likely to fail – regardless of what the competition is doing or how much customers may value their product.

So how can a producer ensure a profit? They must understand and manage costs effectively and then price the product accordingly. In order to understand and manage costs, it is important to develop an enterprise budget. An enterprise budget details the costs for items such as crop inputs, labor, machinery, and land, among others.

Steps

It is often easier to adapt existing budgets than develop one from scratch. Numerous enterprise budgets are available from land grant universities, but which one should a producer choose? What adjustments should be made to a published budget? What makes one budget better than another (related to comparability)? If three tomato budgets are found online (one from Michigan, one from California, and one from Iowa), which one is best to use?

The first consideration is the scale of the production system being proposed. For example, 14 one- to two-page budgets for small-farm vegetable growers can be found from Iowa State University Extension and Outreach at www.extension.iastate.edu/agdm/crops/html/a1-17.html. Vegetable farmers growing produce or herbs on a bed system over a few acres could begin with these budgets. Researchers and extension workers at other land grant universities (such as the University of California-Davis or Oregon State University, among many others) have developed budgets for commercial operations in which many acres of a product are grown. If the goal is to grow, for example, 20 acres of a product or more, then commercial budgets would be more applicable.

The second consideration is the type of production system currently being used or proposed. Organic and conventional budgets differ in managing fertility and pests. Organic systems often use a different crop rotation and set of tillage or weed management tools than conventional systems. Even within conventional or organic systems, fertility and weed management can differ. Therefore, it is important to design a multiple-year cropping pattern prior to developing the first budget.

The third consideration is geography. Soils and pests, among other things, vary by geographic location. Once a producer has determined the scale and type of production system, the budget developed at an institution closest to their location may allow for the fewest alterations.

What's the next step? Assume a producer wants to grow 10-12 different vegetables on a small farm (under five acres) in Wisconsin for sale at the Madison farmers' market. They have found the ISU Extension and Outreach budgets online, and wants to know how to adapt them to their farm. The first step is to share the budgets with local growers and University of Wisconsin Extension personnel.

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They should ask how the crops they are proposing would be grown, and how the costs differ from those presented in the published budgets. In addition, they should find out what types of crop rotations are common in their area, and what products would sell well for their chosen marketing outlet. Keep in mind that a budget should be used only as a guideline or starting point. No budget template will represent any individual farm perfectly, because of soil, climate, and market differences.

The same process would occur if a producer in Washington is looking at growing tomatoes for processing. First, they must determine the scale and production system, find the closest budgets geographically, and then adapt them to their specific location.

While complexity varies among budgets, most have common components. The first component is crop inputs, such as fertilizer, pesticides, and seed. The costs usually depict local production recommendations and prices. A producer should check with a variety of suppliers to determine costs.

Labor, machinery, and land also are common components. However, each of these may be handled quite differently. Labor is normally budgeted based on an hourly rate common to a producer's area for similar work. Some budgets use multiple rates depending upon whether labor is manual or involves handling equipment (Figure 1).

It is assumed that handling equipment requires more skill and therefore requires a higher hourly rate to obtain an adequate supply of laborers to finish the required tasks. If workers receive employment benefits, the costs associated with those benefits should be included in the hourly rate. Unemployment and workers compensation also should be included.

Remember to include labor charges, regardless of whether the labor is supplied by the producer, the producer's family, or purchased from the outside labor market. To remain profitable, a producer must get an economic return for the labor provided. They should check with local growers and extension personnel to make sure the amount of labor and wage rate they use for their budgets are appropriate, given the existing or proposed production system.

Machinery is handled quite differently from budget to budget. The ways vary by complexity, and none is always right or wrong. The important thing is to account for machinery usage in the budget. In complex budgets, machinery costs are segmented into variable (or operating) expenses and fixed (or overhead) expenses (Figure 2). It is important to review the budgets carefully to understand what assumptions were made to determine these costs.

Figure 1.
This section of an enterprise budget from the University of California–Davis (Bolda et al., 2019) illustrates a two-tier labor rate with machine labor, paid at $22.40 per hour and non-machine labor at $16.80.

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Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE AND HARVEST ORGANIC STRAWBERRIES

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Organic	4,250	tray	13.50	57,375	
TOTAL GROSS RETURNS	4,250	tray		57,375	
OPERATING COSTS					
Labor				**10,580**	
Equipment Operator Labor	117.53	hrs	22.40	2,633	
Non-Machine Labor	327.62	hrs	16.80	5,504	
Irrigation Labor	16 52	hrs	16.80	278	
Harvest Labor	128.89	hrs	16.80	2,165	
TOTAL OPERATING COSTS/ACRE				62,951	
TOTAL OPERATING COSTS/TRAY				15	
NET RETURNS ABOVE OPERATING COSTS				-5,576	

For example, a specific field operation per-acre cost may have assumed an annual use of 40 hours for an implement (Figure 3). However, if the actual usage of the implement was 20 hours or 80 hours instead of the assumed 40, the cost per acre would be substantially different. Other budgets may simply use a custom-hire charge common to your area. The custom hire charge would cover the cost of the machinery and often the cost of the machine operator. If custom charges are used, then changes to labor hours should be made to eliminate the possibility of double counting. Regardless of the method used to allocate machinery expenses to the enterprise budget, it is important to understand how it was accomplished, particularly in comparing one budget to another.

Most budgets insert a cost for the land used in production at its common rental value or a percent return to land value. If land similar to the producer's is renting for $200 per acre in the area, a rental charge of $200 should be used for budgeting. Because the land can be farmed by the producer or rented out to someone else at the common rental rate, this practice allocates a charge to the land asset.

Some budgets include an overhead category to cover expenses associated with buildings, insurance, and interest charges, among other items. Again, it is important to understand what expenses are included and how they were calculated in order to adapt a published budget to fit.

Summary

Enterprise budgets can be used for a variety of management decisions including pricing, developing a product mix, and changing production practices. The key to using budgets effectively is to develop them as accurately as possible by reflecting what is going on in an existing or proposed production system.

Once production scale and production system are determined, it is often easiest to begin by adapting an existing published budget. The key to adapting the budget is to understand what assumptions were made in developing the budget and make changes to fit each situation. Producers can contact their local land grant university or extension office to see what local budgets have been developed for a given area.

Figure 2.
This budget from University of California–Davis (Bolda, et al., 2019) illustrates a more complex machinery budget. Both fixed (capital recovery, insurance, and taxes) and operating or variable (repairs, fuel, and lubricant) costs are detailed in the total cost-per-hour calculation. Note that each tractor and implement used in the production of the crop is itemized.

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ORGANIC STRAWBERRIES - CENTRAL COAST - 2019

Table 6. HOURLY EQUIPMENT COSTS

		Strawberry	Total		Cash Overhead		Operating			
Yr.	Description	Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	Total Costs/Hr.
19	55HP 2WD Tractor	971	1200	2.85	0.01	0.15	3.66	10.07	13.74	16.76
19	75HP 4WD Tractor	135	600	6.05	0.03	0.38	4.75	13.74	18.49	24 95
19	90HP 4WD Tractor	179	800	5.39	0.03	0.34	4 30	16.49	20.79	26 55
19	ATV 4WD	16	285	3.00	0.01	0.15	1.09	2.31	3.40	6 56
19	Blade Rear 3 pt 8'	28	100	1.00	0.01	0.06	0.00	0.00	0.00	1.06
19	Cultivator 3R 12'	20	100	6.07	0.03	0.35	2 11	0.00	2.11	8.56
19	Disc-Offset 14'	26	100	10.22	0.05	0.59	2.73	0.00	2.73	13 59
19	Drip Mchne 1-48"R	55	100	6.34	0.03	0.33	2 53	0.00	2.53	9 23
19	Lstr/Shpr 3-48"R	54	133	2.74	0.01	0.14	1 14	0.00	1.14	4.04
19	Mulch Mchne 1-48"R	41	100	1.92	0.01	0.11	0 38	0.00	0.38	2.41
19	Pickup Truck 1/2 T	46	400	8.03	0.03	0.35	3.72	8.65	12.37	20.78
19	Punch Mchn 1-48"R	20	100	3.19	0.02	0.18	0.63	0.00	0.63	4.02
19	Ripper-5 Shank 18'	56	125	5.52	0.03	0.32	3.73	0.00	3.73	9 59
19	Sprayer w/20'Boom	79	300	1.60	0.01	0.06	1 17	0.00	1.17	2.84
19	Trailer-Pipe	99	200	0.62	0.00	0.04	0.00	0.00	0.00	0.66
19	Triplane 15'	27	150	9.45	0.05	0.54	3.75	0.00	3.75	13.80
19	Truck 1 Ton #1	760	1000	5.06	0.02	0.26	2 34	4.33	6.67	12.01
19	Mower 4'	10	100	2.24	0.01	0.13	1.70	0.00	1.70	4.08
19	Bug Vacuum	641	750	10.58	0.02	0.24	11 27	0.00	11.27	22 12
19	Chisel 12'	24	75	10.22	0.05	0.59	2.46	0.00	2.46	13 33
19	Truck 1 Ton #2	654	1000	5.06	0.02	0.26	2 34	4.33	6.67	12.01

Available Organic Enterprise Budgets

Production budgets should be available from the producer's closest land grant university. Local research and extension personnel are a good source of region-specific crop budgets.

North Carolina State University

http://projects.ncsu.edu/project/arepublication/AREno31.pdf

"North Carolina Organic Vegetable Production Cost Study," published in 2003 by Edmund Estes, Tony Kleese, and Laura Lauffer of North Carolina State University's department of agricultural and resource economics.Includes enterprise budgets for broccoli, kale, lettuce, peppers, salad mix, summer squash, sweet corn, and tomatoes based on actual production costs for three growers in 2001.

University of California-Davis

https://coststudies.ucdavis.edu

The following is a partial list of the nearly 100 budgets available.

- almonds
- apples
- asparagus
- blackberries
- broccoli
- cabbage
- celery
- cherries
- grapes
- lemons
- lettuce
- olives
- onions
- oranges
- peaches
- pears
- peppers
- plums
- strawberries

Oregon State University

http://arec.oregonstate.edu/oaeb

The following is a partial list of the nearly 120 budgets available:

- apples
- blackberry
- blueberry
- broccoli
- bush beans
- cauliflower
- cherries
- grapes
- leaf lettuce
- pears
- peas
- potatoes
- radishes
- spinach
- strawberries
- sweet corn
- watermelon

Figure 3.
Estimated machinery costs. The cost estimates below are for on-farm use, excluding labor. Depreciation is based on current replacement cost, and interest is based on average market rates. Fixed costs will be greater for newer machinery. If annual machine use is greater than that assumed, fixed costs per acre will be lower, and vice versa. Hauling costs are based on a round trip of one mile. Remember that these are estimates and they should not take the place of accurate recordkeeping. Diesel fuel is estimated to cost $2.48 per gallon, delivered to the farm in bulk. This excerpt of estimated machinery costs is from Iowa State University (Plastina, 2019).

Operation	Hours of Use Assumed per Year	Fixed Cost per Acre (depreciation, interest, insurance, housing)	Variable Cost per Acre (fuel, oil, repairs)
Subsoiling (V-ripper)	120	$6.30	$7.50
Moldboard plow	120	9.10	9.50
Chisel plow	120	3.60	3.90
Chop stalks	120	4.90	4.80
Tandem disk	120	4.60	3.40
Offset disk	120	3.90	3.20
Peg tooth harrow	60	2.10	1.50
Sprayer/disk	120	3.70	2.90
Field cultivator	120	2.70	2.70
Disk/Field cultivator	120	2.70	2.60
Strip tiller	120	3.00	3.10
Bulk fertilizer spreader	60	2.00	1.60
NH3 applicator	120	4.30	4.40
Chisel plow, NH3 applic.	120	6.10	6.80
Grain drill	100	4.50	4.00
Broadcast seeder	100	2.90	1.70
Planter	100	5.90	4.80

Further Reading

Chase, Craig. 2006. *Using Enterprise Budgets to Make Decisions*. File A1-19. Ames: Iowa State University Extension and Outreach. www.extension.iastate.edu/agdm.crops.html/a1-19.html

Chase, Craig. 2008. *Pricing for Profit*. File C1-55. Ames: Iowa State University Extension and Outreach. www.extension.iastate.edu/agdm/wholefarm/html/c1-55.html

Chase, Craig. 2006 (updated 2011). *Iowa Fruit and Vegetable Production Budgets*. File A1-17. Ames: Iowa State University Extension and Outreach. www.extension.iastate.edu/agdm/crops/html/a1-17.html

References

Bolda, Mark, Laura Tourte, Jeremy Murdock, and Danial Sumner. 2019. *Sample Costs to Produce and Harvest Organic Strawberries*. Davis: University of California Cooperative Extension. https://coststudyfiles.ucdavis.edu/uploads/cs_public/a9/5b/a95bfaa1-c387-4153-8021-05ad8bca327f/2019organicstrawberrycc-final-june_2019.pdf

Plastina, Alejandro. 2019. *Estimated Costs of Crop Production in Iowa–2019*. File A1-20. Ames: Iowa State University Extension and Outreach. www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf

Kathleen Delate (left), professor of horticulture and extension field specialist in organic agriculture, discusses the organic vegetable plots at Iowa State's Neely-Kinyon Memorial Research and Demonstration Farm near Greenfield. Local resident Steve Lilly gets a close up look at the BCS roller-crimper.

Updated by Craig Chase, program manager, Farm, Food and Enterprise Development, Iowa State University Extension and Outreach. Originally written by Craig Chase in 2009 as *Developing Enterprise Budgets for Organic Crops*, File A1-25, ISU Extension and Outreach.