CONDUCTING A COST ANALYSIS

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In the late 1990s, average annual utilized peach production for Alabama, Arkansas, Georgia, Oklahoma, and South Carolina averaged 260 million pounds. Average value of production in these states was over $79 million. Peach production can be a profitable enterprise. However, as with any enterprise, potential profits should be analyzed before investments are made. Such an analysis can be made using an enterprise budget. The materials that follow are guidelines to develop a relevant budget. Differences in varieties, size of operation, production practices (particularly irrigation) and associated production costs, and prices received for fruit will affect orchard budgets.

COMPONENTS OF A BUDGET

Three areas of information are generally included in the peach production budget: estimated crop yield, market price for the crop, and production (or input) costs. Returns to management are generally calculated over the expected life span or production period of an orchard. This time varies, but on average it would range from pre-planting to the first year of meaningful production and continue through the last year of full production (from 8 to 18 years). Returns to management would be calculated again starting with the next planting cycle.

EXPLANATION OF COSTS

Production costs fall into two categories: fixed and variable. Fixed costs are those that accrue independently of the size of production. They include land, machinery, management, and overhead expenses. Land is generally assumed to be owned; however, an opportunity cost (what the money that has been put into land could earn if it had been invested elsewhere) may be charged for land. Ownership costs for equipment, including depreciation, interest, taxes, and insurance, are charged as fixed costs. Management may or may not include cash costs. For owner operators, it is not a cash expense; however, a hired manager would be included as a cash expense. Finally, general overhead includes items that are not specific to peaches, such as tools, farm shop, and other farm equipment. **Variable costs are costs that are directly associated with production.** These costs are further separated into costs associated with pre-harvest, harvest, packing, and marketing. Key variable cost categories include fertilizers, pesticides, labor, machinery fuel and maintenance, and interest on operating capital.

ESTABLISHMENT COSTS AND AMORTIZATION

Orchard establishment generally takes place over a three-year period. In each of those years there are a number of fixed and variable costs that need to be considered. Tables 1 through 3 list the types of costs generally incurred in the early years of orchard life. The costs during the non-bearing (pre-productive) years are compounded at a fixed interest rate until amortization begins during the fourth year.

PRODUCTION BUDGET

Table 4 presents an example of an annual production budget for years four through each remaining year of production. In this example, harvest and marketing costs are the largest cost items in the budget. These costs are estimated to be $3.04 per 1/2 bushel. (Pick-your-own operations would have much lower harvest and marketing costs.) The fixed cost section includes recapture of establishment costs of $165 per acre. This is the largest component of fixed costs. The last section in Table 4 gives the cost per 1/2 bushel breakdown by cost groups. The total budgeted cost per 1/2 bushel of $4.61 indicates that a price of $4.61 per 1/2 bushel is needed to break even.

Table 5 shows potential net income variation given the anticipated variation of prices and yields. The expected prices, yields, and net income are anticipated averages for the marketing and cultural practices that are included. Optimistic levels are those levels that would be expected to be obtained one-year-in-six. The pessimistic levels also are for one-year-in-six. When these prices and yields are included with the budgeted costs, net income probabilities can be estimated.

For the data presented as an example, there was a 74 percent probability of covering all budgeted costs. The net income level of $581 per acre should be exceeded half the time and not be reached about half the time. About one-year-in-six returns over $1,438 would be anticipated; in one-year-in-six more than $394 would be lost (an income of -$394).

IRRIGATION

Irrigation is not charged off in the budget, but a line is included for irrigation. In most cases, irrigation increases yields by increasing fruit size, thus fewer bushels are needed to pay for the added costs, because large fruits normally receive higher prices. See your Cooperative Extension Service specialist for more information on irrigation costs and returns to irrigation.

BREAK EVEN PRICES

Table 6 shows the break-even prices for various yield levels. The pre-harvest variable costs and fixed costs decline fairly rapidly with increases in yield. At 200 bushels, the pre-harvest cost per bushel is $3.36, while at 600 bushels it declines to $1.12. Fixed cost per bushel is $2.13 at 200 bushels, but only $0.71 at 600 bushels. The break-even prices (for all costs) show a similar pattern. At 200 bushels yield, the break-even price is $8.53 per 1/2 bushel. At 600 bushels yield, the break-even price declines to $4.87 per 1/2 bushel.

INCOME OVER VARIABLE COSTS

Table 7 shows the income over variable costs (pre-harvest, harvest, and marketing costs). At a price of $6.00 per 1/2 bushel, it takes a yield of nearly 250 bushels just to cover the variable costs. At $8.00 per 1/2 bushel, a yield of about 150 bushels covers variable costs.

DEVELOPING BUDGETS FOR YOUR OPERATION

Many of the southeastern states have developed enterprise budgets for peach production in their area. However, as mentioned earlier, differences in varieties, operation size, management practices, input prices, and peach prices will affect the budget for any given orchard. Please check with Cooperative Extension personnel in your state for peach enterprise and irrigation budget information.

Alabama:	Contact your Cooperative Extension Service agent for recommendations suitable to your orchard or visit http://www.aces.edu/ for more information.
Arkansas:	The Arkansas Agricultural Experiment Station offers a special report entitled, "Economic Analysis of Commercial Fresh Market, Irrigated Peach Production in Arkansas." Contact a Cooperative Extension Service agent for recommendations suitable to your orchard or visit http://www.uaex.edu for more information.
Florida:	The most recent peach enterprise budgets for Florida can be downloaded from the worldwide web at http://nfrec.ifas.ufl.edu/Hewitt/budgets.htm or contact your Cooperative Extension Service agent for recommendations suitable to your orchard or visit http://www.fred.ifas.ufl.edu/ for more information.
Georgia:	The Georgia Cooperative Extension Service offers budgets for establishment and midseason peach production. Contact The University of Georgia Department of Agricultural and Applied Economics in Tifton or visit http://commodities.caes.uga.edu/fieldcrops/gapeach/ for more information.
Oklahoma:	The University of Oklahoma offers budgets for preplant year, establishment year, year 2, year 3, and years 4-15. You can download these budgets from http://www.agecon.okstate.edu/archives/budgets/statecrp.htm#Fruits%20&%20Vegetables:. Contact Oklahoma State University Department of Agricultural Economics or visit

	http://www.agecon.okstate.edu for more information.
South Carolina	Contact your Cooperative Extension Service agent for recommendations suitable to your orchard or visit http://cherokee.agecon.clemson.edu/extindex.htm for more information.

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Table 1. Types of establishment and maintenance costs considered in the first year of the operation. Adapted from Pardue et al. (1996) and Westberry and Collier (1998).

Item	$/Unit
Variable Costs:	
Fertilizer	
Nitrogen	pound
Phosphate (P205)	pound
Potash (K20)	pound
Lime	ton
Land Leveling and Terracing	hour
Seeds for Cover Crop	pound
Trees	each
Pesticides	
Herbicides	acre

	Fungicides	acre
	Insecticides	acre
Labor		hour
Machinery		
	Fuel	gallon
	Repair and Maintenance	acre or hour
Irrigation		acre inch
Interest		dollar (@ %)
Misc		
Fixed Costs:		
Tractor		hour
Other Equipment		hour
Irrigation		acre inch
Land		dollar
Overhead		dollar
Misc		

Table 2. Types of establishment and maintenance costs considered in the second year of the operation. Adapted from Pardue et al. (1996) and Westberry and Collier (1998).

Item		$/Unit
Variable Costs:		
Fertilizer		
	Nitrogen	pound
	Phosphate (P205)	pound
	Potash (K20)	pound
Lime		ton
Trees (Replacements)		each
Pesticides		
	Herbicides	acre

	Fungicides	acre
	Insecticides	acre
Labor		
	Machinery and Others	hour
	Dormant Pruning	hour
	Summer Pruning	hour
	Remove Fruit	hour
Machinery		
	Fuel	gallon
	Repair and Maintenance	hour
Irrigation		acre inch
Interest		dollar
Misc		
Fixed Costs:		
Tractor		hour
Other Equipment		hour
Irrigation		acre inch
Land		dollar
Overhead		dollar
Misc		

Table 3. Types of establishment and maintenance costs considered in the third year of the operation. Adapted from Pardue et al. (1996) and Westberry and Collier (1998).

Item		$/Unit
Variable Costs:		
Fertilizer		
	Nitrogen	pound
	Phosphate (P205)	pound
	Potash (K20)	pound
Lime		ton
Trees (Replacements)		each

Pesticides		
	Herbicides	acre
	Fungicides	acre
	Insecticides	acre
Labor		
	Machinery and Others	hour
	Dormant Pruning	hour
	Summer Pruning	hour
	Remove Fruit	hour
Machinery		
	Fuel	gallon
	Repair and Maintenance	hour
Irrigation		acre inch
Interest		dollar
Misc		
Harvesting and Marketing		bushel
Fixed Costs:		
Tractor		hour
Other Equipment		hour
Irrigation		acre inch
Land		dollar
Overhead		dollar
Misc		

Table 4. Example of a mid-season peach budget. (Westberry and Collier 1998)

Item	Unit	Quantity	Price	Amt/ac $	TOTAL $
Variable Costs					
Trees (replants)	Each	3.00	1.75	5.25	5
Lime, applied	Ton	0.50	24.00	12.00	12
Fertilizer	Cwt	4.00	7.80	31.20	31
Nitrogen	Lbs.	85.00	0.31	26.35	26
Chemicals	Appl.	35.00		197.74	198

Machinery						
Fuel		Acre	14.86	0.75	11.14	11
Repairs		Acre	1.00	5.49	5.49	5
Labor		Hr.	63.49	5.17	328.40	328
Land rent		Acre	1.00	0.00	0.00	0
Irrigation		Acre Inch	2.00	5.92	11.85	12
Other		Acre	1.00	0.00	0.00	0
Interest on operating capital		$	629.42	10.0%	41.98	42
Pre-Harvest Variable Costs					671.41	671
Harvest and Marketing Costs						
Picking and hauling		1/2 Bushel	700.00	0.93	647.50	648
Grading and packing		1/2 Bushel	700.00	0.83	577.50	578
Containers		Each	700.00	0.85	595.00	595
Marketing @	7.50%	1/2 Bushel	700.00	0.44	307.13	307
Total Harvest and Marketing				3.04	2,127.13	2,127
Total Variable Costs					2,798.53	2,799
Fixed Costs:						
Machinery		Acre	1.00	85.86	85.86	86
Irrigation		Acre	1.00	81.54	81.54	82
Recapture establishment costs		Acre	1.00	164.60	164.60	165
Land		Acre	1.00	60.00	60.00	60
Overhead and management		$	671.00	0.05	33.57	34
Total Fixed Costs					425.57	426
Total budgeted cost per acre					3,224.10	3,224
Costs Per 1/2 Bushel						
Pre-harvest variable cost per 1/2 Bushel						0.96
Harvest & marketing cost per 1/2 Bushel						3.04
Fixed costs per 1/2 Bushel						0.61
Total Budgeted Cost per 1/2 Bushel						4.61

Table 5. Peach prices, yields, and risk rated net returns.

	Optimistic	Expected	Pessimistic

Yield (1/2 bushels)		900		700		350	
Price per 1/2 bushels		6.60		5.85		5.10	
Net Returns ($)	1,866	1,438	1,010	581	94	(-394)	(-882)
Chances of obtaining the return listed above or more	6%	16%	33%	52%			
Chances of obtaining the return listed above or less				48%	29%	16%	7%
Overall chance of profit at expected yield and price				74%			

Table 6. Break-even prices for various yield levels.

Yield Per Acre (Bushel)	Pre-harvest Costs (Bushel)	Fixed Costs (Bushel)	Harvest and Marketing (1/2 bushel)	Breakeven (1/2 bushel)
100	6.71	4.26	3.04	14.01
150	4.47	2.84	3.04	10.35
200	3.36	2.13	3.04	8.53
250	2.68	1.70	3.04	7.43
300	2.24	1.42	3.04	6.70
350	1.92	1.22	3.04	6.17
400	1.68	1.07	3.04	5.78
450	1.49	0.95	3.04	5.48
500	1.34	0.85	3.04	5.23
550	1.22	0.77	3.04	5.03
600	1.12	0.71	3.04	4.87
650	1.03	0.66	3.04	4.73

700	0.96	0.61	3.04	4.61
750	0.89	0.57	3.04	4.50
800	0.84	0.53	3.04	4.41
850	0.79	0.50	3.04	4.33
900	0.75	0.47	3.04	4.26

Table 7. Income above variable costs at various prices and yields.

	Price Per 1/2 Bushel				
Yield	4.00	6.00	8.00	10.00	12.00
100	-575	-375	-175	25	225
150	-527	-227	73	373	673
200	-479	-79	321	721	1,121
225	-455	-5	445	895	1,345
250	-431	69	569	1,069	1,569
300	-383	217	817	1,417	2,017
350	-335	365	1,065	1,765	2,465
400	-287	513	1,313	2,113	2,913
450	-239	661	1,561	2,461	3,361
500	-191	809	1,809	2,809	3,809
550	-143	957	2,057	3,157	4,257
600	-95	1,105	2,305	3,505	4,705
650	-47	1,253	2,553	3,853	5,153
700	1	1,401	2,801	4,201	5,601
750	49	1,549	3,049	4,549	6,049
800	97	1,697	3,297	4,897	6,497
850	145	1,845	3,545	5,245	6,945
900	193	1,993	3,793	5,593	7,393