

Western SARE Farmer / Rancher Project number FW06-042
Harvest Frequency, Yield, and Economics of Summer Squash

Market Garden Summer Squash Enterprise Budget

Traditional Enterprise Budgets from Cooperative Extension studies generally are based on a per acre basis for a single commodity. In contrast, produce vendors at farmers' markets use different management practices than conventional farmers. Market vendors often raise a diversity of crops in a relatively small area. They have relatively small plots of summer squash, generally only a row or two, 60 or fewer plants or hills. Most prepare the soil with a tiller rather than a plow, most plant by hand, use compost or other organic supplements as fertilizer, and use minimal pesticides. For some, production is a hobby, or a small enterprise taken on during retirement or as a second income. Traditional Enterprise Budgets don't apply.

As part of a USDA Western SARE Farmer / Rancher Grant on "Harvest Frequency, Yield, and Economics of Summer Squash", I developed an enterprise budget for market squash production that should be useful to other market gardeners. I modified an enterprise budget for summer squash from the University of Kentucky Cooperative Extension Service, using my own 2007 costs in an initial example for the budget. The original budget is available from:
http://www.uky.edu/Ag/AgEcon/pubs/software/budgets_veg_melon.html

I particularly like the UK vegetable enterprise budget because it clearly separates production and marketing costs, fixed costs such as insurance and taxes on the land, and unpaid family labor. The grower can easily determine how much their revenue compensates for costs in each category in a hierarchical progression. Some market gardeners may be satisfied covering the variable production and marketing costs. Others may want to be sure their revenue offsets some of their taxes and insurance costs, but not necessarily their labor. Others hope to pay their family wages and still have enough profit to increase their operations.

Because market gardeners often grow a variety of crops, it can be confusing to determine how one crop contributes to revenue and costs. To deal with this problem, I modified the UK enterprise budget so that most costs are multiplied by the percentage of total garden that is planted in squash, or by the percentage of the total income that can be attributed to squash. Market gardeners and small farmers may want to keep track of these percentages. For example, my squash patch was estimated to be 10% of my entire garden. Therefore, the cost of compost for my squash patch was 10% of the total cost of compost, and my squash helped to compensate for 10% of the cost of new sprinkler parts. Similarly, the cost of travel to the market, and market fees were multiplied by 0.16, the proportion of squash sales in my total sales.

On the other hand, the cost of squash seed was not multiplied by the proportion of the garden planted in squash or by the proportion of squash sales in total sales. Rather, the sum of the cost of seed packets was divided by 2, the estimated number of years that I will be able to use the seeds in my garden.

A number of categories on the budget are not currently relevant to my operations, but they may be relevant to other market growers. These include hired labor and pollination costs.

The lines for interest rate and interest from borrowed operating capital (or opportunity capital) may be a minor component of an enterprise budget for market gardeners, since most of us do not borrow short term operating capital. Seen as “opportunity capital” this entry takes into account the interest that one could earn if one left the money in the bank rather than paying operating costs. With the current low bank interest rates and relatively low operating expenses for a market garden, the lost interest is almost insignificant, but for some it may be important.

Figure 1 is a printout of my 2007 budget in an MSExcel worksheet. This enterprise budget tells me that in 2007 my sales of squash paid for the variable costs of growing the squash, but only part of the fixed costs, with nothing left for my labor. One could say that I paid \$541 for the privilege of growing and selling squash.

A line at the bottom of the budget estimates the savings from eating my own produce and freezing some for the winter. In this line I estimate that my squash patch provided me with vegetables for 45 meals during the year. If I did not have my own squash I estimate that I would have spent an average of \$3.00 for produce (not necessarily squash), per meal so my squash patch is saving me \$135 a year. This could be seen as reducing my losses on squash production to only -\$408.

Note that this budget could be modified for other crops that are grown by a market gardener.

2007 was a particularly bad year for my market operation because a family emergency in the spring prevented me from getting my summer garden planted until the middle of July. I missed most of the market season. Also, the average price per pound was lower than I intended, probably because some squash did not sell (squash that I used, or donated to the Parma Senior Center and Ronald McDonald House).

What changes will result in a profit from squash in my market garden?

I can use the enterprise budget to consider what combination of yield, price of squash, and costs of growing squash will result in a profit. This information should improve my future squash marketing.

In a normal year I would like the revenue from squash to pay for both variable and fixed costs, as well as something for my unpaid labor. Is this possible in a small market garden?

I assumed that I would be able to get an earlier start growing squash so that I can sell it at market for 12 weeks instead of 9. I assumed that other crops in my garden bring in a total of \$3000. I also assumed that I could increase my yield of squash from about 400 to 600 lbs squash per year without using more space in my garden, and without adding any additional cost inputs. I assumed that an increase to 800 lbs squash per year would require me to increase my squash patch to 15% of my garden, while an increase in yield to 1000 lbs would require 20% of my

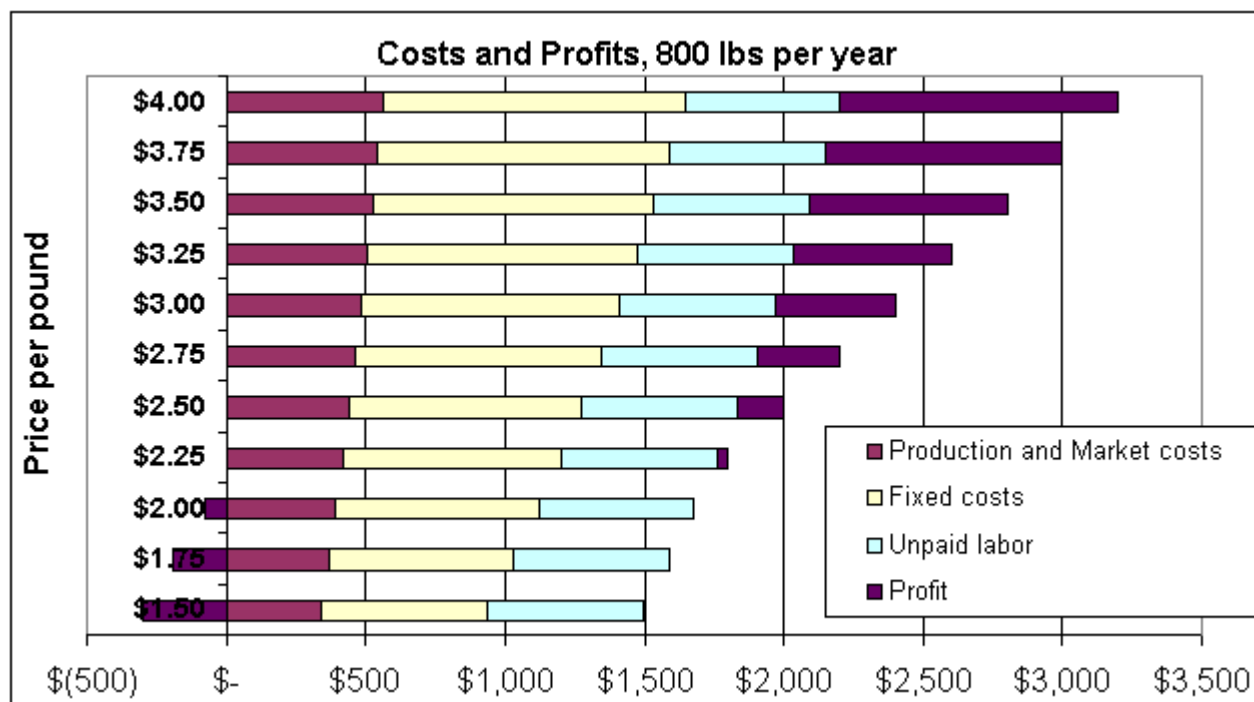
garden space. Finally, I assume that my labor does not increase as a result of the greater yields (probably not a realistic assumption)

The results are summarized in Figure 2. This graph shows that I can't make a profit from 400 lbs of squash even if it sells for \$4.00 per pound, a price that would be too expensive for most customers at the Nampa Farmers' Market. However, if I can grow and sell 600 lbs of squash, I would profit if it sells for more than \$2.75 per pound. In my 2006 study I found that selling 5 – 8 mini squash for \$1.00 is equivalent to selling for \$2.59 - \$2.97 per pound. Hence, I may be able to meet these criteria for a profit from mini summer squash.

If I can increase my sales to 800 or 1,000 lbs of squash per year, I break even at more affordable prices of about \$2.15 and \$1.75 respectively. The higher my squash yield, the faster the profits go up if the price goes up (Fig. 2). Higher yields of squash will require increasing my customer base. Selling squash earlier at the market will help because I can build my customer base earlier. Selling at a second weekday market and to restaurants can also help. I am also considering value added products such as grilling squash for consumption at the market.

For a yield of 800 lbs per year, I plotted the variable costs, fixed costs, unpaid labor costs and profits as the price of squash increases, in Fig. 3. Surprisingly, the fixed costs increase as the price per pound increases. This is because squash sales make up a larger proportion of the garden's total revenue as squash price increases. Therefore, squash sales compensate for a larger proportion of the fixed costs with increasing price per pound.

Figure 3



This figure also shows that Production and Marketing costs increase only slightly as the price per pound increases (again because of the increase in proportion of sales that are attributed to

squash). At \$2.25 per pound, I would make a small profit from selling squash, but an increase to \$2.75 or more per pound would cover all expenses including some of my labor costs, plus some additional profit.

In summary, if I can double production and increase my customer base while maintaining a target price of \$2.50 - \$2.75 per pound throughout the season, I should be able not only to pay my expenses, but also to make a profit from mini squash.

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Figure 1:
SQUASH, SUMMER:
Estimated Costs and Returns
2007

Squash % of sales: **16%** Squash % of garden area **10%** # markets with squash sales **9**

		QUANTITY	PERCENT of garden or sales	UNIT	\$/UNIT	TOTAL	NOTES
GROSS RETURNS							
Summer Squash		396		pounds	\$1.12	\$443.52	
VARIABLE COSTS							
PRODUCTION:							
Soil amendments	(Sulfer, P, etc.)	2	10%	bag	\$16.00	\$3.20	
Fertilizer / compost		2	10%	truckload	\$75.00	\$15.00	
Seed		15	100%	.5 packets	\$1.75	\$26.25	15 varieties, 1/2 package used per year
Sprinkler system parts		1	10%	total purchases	\$120.00	\$12.00	
Pesticides	(Rodent bombs)	1	10%	total purchases	\$37.00	\$3.70	
Cover crop seeds		1	10%	order	\$77.00	\$7.70	
Pollination		0		hive	\$0.00	\$0.00	I get free service from native bees!
Fuel and Lube, tiller		3	10%	gallons	\$3.00	\$0.90	
Repairs	none this year	1	16%	total costs	\$0.00	\$0.00	
Irrigation district fees	annual fee	1	16%	total fee	\$220.00	\$35.20	I use % of sales rather than garden area
Hired Labor	none this year	0		hours	\$8.00	\$0.00	
Total Production Cost						\$103.95	
HARVESTING AND MARKETING:							
Market dues		1	16%	fee	\$35.00	\$5.60	
Stall Fees		1	6%	gross returns	\$443.52	\$26.61	6% of sales each week
Travel to market		9	16%	markets	\$25.20	\$36.29	\$0.45 per mile, 56 miles round trp
Market service fees		9	16%	markets	\$3.00	\$4.32	Fixed fee charged weekly by Farmers' Market
Power to run refrigerator		9	75%	weeks	\$2.08	\$14.06	See ** below
Bags		9	50	each	\$0.05	\$22.50	~50 bags used per week
Scale certification and maintenance		1	16%	total cost	\$78.70	\$12.59	
Total Harvest and Marketing Cost						\$121.97	
Annual Interest Rate				4.0%			Interest on a short term loan to pay for your variable costs.
Interest on borrowed operating capital (or opportunity capital)						\$2.20	Or, interest you lost by using your own cash
TOTAL VARIABLE COST						\$228.12	
RETURN ABOVE VARIABLE COSTS						\$215.40	
FIXED COSTS							

Depreciation on Machinery and Equipment	(Tiller, fridge, scale)	16%	\$50.00	\$8.00	
Depreciation on Irrigation System		16%	\$100.00	\$16.00	
Irrigation annual fee		16%	\$220.00	\$35.20	I use % of sales rather than garden area
Taxes on Land		16%	\$1,589.00	\$254.24	
Taxes on personal property		16%	\$30.64	\$4.90	
Insurance, market		16%	\$112.50	\$18.00	
TOTAL FIXED COSTS				\$336.34	
TOTAL EXPENSES				\$564.46	
RETURN TO OPERATOR LABOR, LAND, CAPITAL, AND MGT				-\$120.94	
Operator and Unpaid Family Labor	65	hours	\$6.50	\$422.50	
RETURN TO LAND, CAPITAL, AND MANAGEMENT				-\$543.44	
Savings on our shopping bill from eating squash from our garden and freezing some for the winter					
	# meals	45	\$3.00	\$135.00	What would vegetables cost if I did not eat mine?
				-\$408.44	amount lost in 2007

Figure 2

