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Staff Paper

Cost of Cabbage Production in Monroe County, Michigan

by

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Staff Paper 2002-34

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This bulletin represents a tool that can help producers, consultants, educators, and agribusinesses working with producers estimate costs of production and expected profit based on “typical” cabbage management strategies found in Monroe County, Michigan. The budget included in this bulletin will allow users to revise inputs based on their management strategies and calculate their expected cost and profit. This flexibility provides a decision aid to search for systems that generate higher net returns to the farm’s resource base.

The brief outline of cultural and pest management practices included in this publication should be supplemented with publications from Michigan State University or from other Universities. See the References section for resources. Many are available on-line.

Cabbage Production

Cabbage is a cool season crop suitable for growing throughout the season when temperatures are below 85°F. It can withstand moderate frosts, lending itself to early spring planting and fall harvest in Michigan. In Michigan, the crop is direct-seeded in treated beds then transplanted starting in April. Several varieties of cabbage are grown to meet different harvesting dates and allow staggered harvests. Early-maturing cabbage cultivars are very compact and grow rapidly. Mid- to late-maturing cultivars are larger and heads can be harvested early or later in the season.

Site Selection & Planting

Preferably, cabbage should be planted in muck or clay soils but sandy sites can also be used with proper management to retain adequate moisture. The soil must have adequate nutrients and water available. Cabbage grows best in nutrient rich, well-drained soil with a pH above 6.0. Soils with a pH below 6.0 should be adjusted using lime. Cabbage is sensitive to water logging so it should be grown on well-drained soils. It has a shallow root system so it requires one to two inches of water per week. Transplants are grown four to six weeks before planting in the field. The majority of cabbage production occurs in raised beds and most of the crop is planted from April 20 to June 10. Fertility management includes fall applications of P, K and B. Nitrogen applications are split between planting and sidedressing. Total N applied is determined by cropping history and according to variety and season of maturity. Harvest begins in June and continues through mid-November. It is important to schedule and complete harvest so that maximum yield and quality are attained.

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Pest Management

When seeking advice on use of labeled pesticides (including herbicides), please refer to the most current versions of Michigan State University Extension Bulletins titled “Insect, Disease and Nematode Control for Commercial Vegetables” (Extension Bulletin E-312) and “Weed Control Guide for Vegetable Crops” (Extension Bulletin E-433). They are available on-line at <http://www.msue.msu.edu/vegetable/Resources/E312/E312.htm> and <http://www.msue.msu.edu/vegetable/Resources/weeds/weed.htm> respectively. Specific herbicide and pesticide names have been used in this publication to facilitate accurate budgeting, but Michigan State University does not endorse any of the brand name products listed and does not direct producers to limit management systems to these products.

Pests of cabbage must be controlled for a profitable harvest. Monitoring allows early detection so treatment can be prompt and effective. A subscription to the MSU Vegetable Crop Advisory Alert would provide a good pest management reference. It is available as a mail subscription or over the internet at <http://www.msue.msu.edu/ipm/vegCAT.htm>

Weed control Weeds should be controlled by herbicide applications prior to transplanting the beds. Beds should be transplanted with a minimum of soil disturbance. Apply herbicides post emergence as needed for weed control.

Insect pests of cabbage include thrips, aphids, cabbage maggots and larvae of the cabbage worm, cabbage looper and diamondback moth. Treatment at planting is essential to controlling cabbage maggot. See bulletin E-312 for control recommendations. Alternating pesticides between applications will reduce resistance of the targeted pests.

Diseases. The economic diseases that attack cabbage include downy mildew and Alternaria leaf spot. Black rot caused by bacteria on the seed can also represent a serious problem. Seed treatments are important to prevent problems with black rot and damping off. Nematodes can also cause serious problems. Field sanitation, use of certified seed and timely monitoring are management practices that can limit disease problems.

Harvest and Handling

Once cabbage is harvested, it should be kept out of direct sunlight then transported to storage where it is cooled in 32° F rooms with 95% humidity. Medium sized heads typically take 18 hours to cool to 36° F.

Cost of Production Budget

The budget developed using information gathered from growers is presented in Table 1. Details of some practices are mentioned in footnotes. To adapt this budget, insert or remove individual practices as necessary.

Because expected prices and yields vary across years and producers, no revenue was included in this budget. However, Table 2 shows expected net returns at a variety of typical prices and yields. Where indicated in the budget, the cost structure does vary by yield. Use of this table should help producers compare expected returns from typical prices and yields using practices

outlined above and detailed in the budget. *If the budget is modified to better fit a different production system, Table 2 will not accurately represent net returns per acre.*

Approach

The information on cabbage cost structure and yields was developed using a focus group of growers with a good knowledge of the industry and good field, enterprise, and financial records. The process was initiated by defining a cabbage production system and strategic planning context representative of Monroe County, Michigan. Subsequently, both the sequence of decisions and the information necessary to make these key decisions were collected. This process resulted in a list of inputs and input prices that were then translated into costs, which were verified against grower records.

Because the production system and details were derived from grower input, fertilizer and chemical use may not match some horticultural recommendations. All grower practices were verified and do reflect current procedures. The following budget reproduces, as completely as possible, all costs incurred by these growers.

Pricing Annual Costs of Capital Services (Buildings, Machinery, and Equipment)

Estimating the annual cost of using buildings, machinery, equipment and other assets is a challenge in cost of production studies. In previous studies of Michigan horticultural crops, focus groups constructed a representative farm with fixed acreage and then constructed the buildings, machinery, and equipment needed to operate this farm. They also generated associated labor needs and repair and operating costs. This approach has the advantage of being very tangible but also makes it difficult to interpret results for alternative farm sizes.

In this study, an alternative approach was taken. Buildings, machinery and services were priced to the enterprise on a "custom" basis. Further, services such as land preparation were priced to the enterprise as a "bundled" service/task reflecting both the machinery and labor components of the service.

This approach requires some judgment because costs such as buildings to house machinery and equipment, the farm shop, and labor used in maintenance of machinery and equipment must be included in the "custom fee" as well as the "depreciation and interest" on the machinery and equipment. The fact that this custom fee approach was used does not imply that custom operators did all the tasks. It simply means the tasks are priced to the enterprise as if a custom operator had completed them. The services may well have been provided by the "machinery services enterprise" of the farm. As a double check, members of the focus group attempted to compare the aggregate custom fee costs to those based on their accounting records which included labor, custom fees, and depreciation and interest on buildings, machinery, and equipment. Custom fees were also double-checked against survey information when available.

References

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Table 1. Cabbage budget. Michigan, 2002.

Cabbage, Fresh					Your Farm
Cabbage, Early Season, Hand Harvested					
	Quantity	Unit	Price per Unit	Cost per Acre	
REVENUE SOURCES					
Cabbage ¹	30	ton	\$	-	
TOTAL REVENUE				\$	-
EXPENSES					
Soil preparation ²			\$	44	
Plants	13	1000	\$	24	\$ 312
Transplanting					
Machinery			\$	23	
Labor ³			\$	100	
Fertilizer					
Nitrogen	150	lb	\$	0.20	\$ 30
P ₂ O ₅	125	lb	\$	0.18	\$ 23
K ₂ O	125	lb	\$	0.13	\$ 16
Limestone	0.5	ton	\$	20.00	\$ 10
Boron ⁴	3	lb	\$	3.00	\$ 9
Application	3	apps	\$	6	\$ 18
Herbicide materials ⁵			\$	30	
Insecticide materials ⁶			\$	59	
Fungicide materials ⁷			\$	20	
Spray applications	11	app	\$	7	\$ 77
Cultivation ⁸			\$	50	
Irrigation ⁹			\$	75	
Scouting			\$	7	
Harvest					
Machinery	66,000	lb	\$	0.01	\$ 660
Labor ¹⁰	66,000	lb	\$	0.005	\$ 330
Cooling	59,400	lb	\$	0.005	\$ 297
Handling ¹¹	59,400	lb	\$	0.0007	\$ 42
Bins & Lids ¹²	7	bins	\$	12	\$ 88
Trucking	59,400	lb	\$	0.0025	\$ 149
Land rent ¹³			\$	200	
Insurance			\$	7	
Interest ¹⁴	7%		\$	36	
Tool shed & repair overhead ¹⁵			\$	-	
Management and Supervision ¹⁶			\$	150	
TOTAL EXPENSES				\$	2,862

FOOTNOTES

- 1** Includes 10% cooler shrink resulting in marketable yield.
- 2** Includes V-ripping, disking, power-bedder and rye seed.
- 3** Includes costs for 8 seasonal laborers for 15 hours per day, management supervision, flat delivery and clean-up, and one person fitting the soil ahead of the transplanter. Assumes transplanting rate of 1 acre per hour.
- 4** Be sure to use soil test results to determine amount of Boron necessary. Boron can be toxic to crops following cabbage.
- 5** Includes an application of Treflan and Goal.
- 6** Assumes 2 applications of Lorsban and 6 applications of Lanate and/or one of the Bt products.
- 7** Assumes 2 applications of Bravo.
- 8** Assumes one pass over field. Cost could be higher if weed control is not achieved with indicated herbicides.
- 9** Assumes variable expenses only for a hard hose traveler system. There is no charge for water. See "Selecting a Sprinkler Irrigation System" in the Reference section for more details.
- 10** Assumes cabbages is hand harvested with knives by a 20 man crew including drivers (12 are cutting). It takes this crew about 1.33 hours to cut a semi-load of cabbage.
- 11** Handling cost includes labor and forklifts needed to load and unload trucks and coolers.
- 12** Bins hold 900 lb cabbage. Cabbage can also be harvested into 50 lb crates.
- 13** Includes fixed cost of irrigation system.
- 14** Operating capital assumed to be half of the variable costs (excluding custom charges) for half of the year.
- 15** These costs are included in custom rates.
- 16** Includes cost of marketing, management and supervision time and a vehicle for the manager.

Table 2. Expected cabbage net income (loss) per acre at selected price and yield combinations.

Price	Yield, tons				
	28	29	30	31	32
\$ 87.00	(\$367)	(\$330)	(\$292)	(\$255)	(\$218)
\$ 88.00	(\$339)	(\$301)	(\$262)	(\$224)	(\$186)
\$ 89.00	(\$311)	(\$272)	(\$232)	(\$193)	(\$154)
\$ 90.00	(\$283)	(\$243)	(\$202)	(\$162)	(\$122)
\$ 91.00	(\$255)	(\$214)	(\$172)	(\$131)	(\$90)
\$ 92.00	(\$227)	(\$185)	(\$142)	(\$100)	(\$58)
\$ 93.00	(\$199)	(\$156)	(\$112)	(\$69)	(\$26)