Yields of Michigan Vegetable Crops

Michigan State University Extension Service

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Many factors affect the yields of vegetable crops. Some of them are under the control of the grower, others are not. Farmers need to consider these factors when estimating yields. In some cases, an increase in yield will not offset the increased cost in producing it. Experience will teach the best combination of factors to obtain optimum returns per acre in a given area. The following factors influence crop productivity.

VARIETY — Early-season varieties of most crops usually do not produce as well as full-season varieties. However, the earliest production often brings higher fresh market prices. With some processing crops, such as tomatoes, it is desirable to start the processing plants as early as possible, so processors pay a premium for early products to make up for the reduction in yield resulting from the use of early varieties.

As a general rule, hybrids will outproduce open-pollinated varieties. Varieties developed specifically for processing usually outproduce fresh market varieties. Some varieties have the inherent capability of producing higher yields than other varieties under certain conditions.

SEASON — Varieties of many crops have been developed for use at certain times of the year. If planted in the wrong season, they often do poorly. For instance, broccoli, cauliflower, and spinach are usually classed as spring or fall types, and don't do as well in the summer. Information on season is usually included in variety descriptions in seed catalogues.

WEATHER is the most unpredictable and least controllable of all the factors influencing yields. Frosts in the spring or fall, cold soils in the spring, lack of sunshine, too much or too little moisture, warm nights during the summer, dry, windy weather, cool, cloudy fall days all have a direct effect on yield potential. Crops respond differently to these factors.

Sometimes, it is possible to overcome adverse weather conditions. Irrigation can take the place of rain. Mulches, tents, and hotcaps in the spring can help warm the soil and protect plants from cold temperatures. Irrigation can be used to protect plants from frost in the spring and fall.

PEST PRESSURE — If not controlled, weeds compete with crops for water, nutrients, light and space. Most crop plants are poor competitors, and will suffer large reductions in yields if not protected from weeds. Potential losses from weeds are greater than from all other pests combined.

Insects, diseases, and nematodes contribute to yield reduction in many crops. In most cases, use of resistant varieties and pesticides gives sufficient control so that a marketable crop can be harvested. In some cases, there is no known control for certain insects or diseases on specific crops–the crop should not be grown if the pest is native to your area.

OTHER CULTURAL PRACTICES such as amounts of fertilizer used, types and timing of cultivation, between-row and in-row spacing, direct-seeding or transplanting, and soil type all influence yields. The more meticulous growers are in tuning cultural practices to their environment and circumstances, the greater their potential yield.

TYPE OF HARVEST — Some processing crops, especially tomatoes and pickles, can be harvested once destructively with a machine, or several times by hand. Hand harvest usually has the potential for higher yields since the plants continue to grow and produce fruit. However, the increased yields may not pay for the added expense of hand harvest. Often, cultural practices differ if the crop is grown for hand or machine harvest.

GRADE STANDARDS, PACKOUT AND STORAGE all influence marketable yields. For instance, U.S. No. 1 globe onions have a minimum 1½-inch diameter. By increasing seeding rate, a farmer can increase total tonnage of onions per acre, mostly in onions less than 2 inches in diameter. However, if the market demands larger onions (e.g., all over 2 inches in diameter), marketable yields will be smaller. It is important to know the market before planting.

Some crops produce large amounts of unsalable material. Carrots and parsnips, for example, produce many crooked, cracked, split, and nubbed roots. Total tonnage per acre may be high, but return per acre is based on packout. If the amount of unusable produce is high, the farmer suffers a double loss, since fertilizer and pesticides used on unmarketable production is wasted.

Vegetable crops put into storage usually suffer a fair amount of shrinkage (loss of marketable weight) before marketing due to disease and moisture loss. If a crop is intended for storage, marketable yield and dollar returns will be affected by condition of the crop when it goes into storage, period of storage, cost of storage, and intended usage. Crops for processing usually have a higher usable percentage after storage than those used for fresh market.

How to Interpret This Guide

Figures given in Table 1 are marketable yields in tons per acre based on current use and grading standards for fresh market. Where yields are substantially different for fresh market and processing, two figures are given. For crops on which little data are available, information was obtained from farmers, processors, extension agents and specialists.

Average yields are averages for Michigan for the past five years. For major crops, these figures are compiled by the Michigan Agricultural Reporting Service.

Good yields are the average yields in normal years for the best farmers growing a commodity. This is the figure for which fertilization and irrigation practices should be geared.

Excellent yields are the figures attainable by the best farmers in very good years. In some cases, yields will surpass these figures, but not often. It is usually not economically prudent to fertilize to these yield expectations.

To estimate the potential yields of your crop packed in standard containers, divide the yield per acre by the net weight of a container listed in Table 2.

Potential returns in dollars per acre can be estimated by checking market reports available from most markets in the U.S. Reports for markets in and around Michigan are available from:

Benton Harbor, MI:
Market News Service
P.O. Box 1204
Federal Bldg., Rm. 206
175 Territorial Road
Benton Harbor, MI 49022
616-925-3279
Recorder: 616-925-1096

Detroit, MI, Terminal Market:
Market News Service
53 Detroit Union Produce Terminal
7201 West Fort Street
Detroit, MI 48209
313-841-1111
Recorder: 313-841-1431

Detroit, MI, Eastern Market:
Detroit Farmer's Market Report
2934 Russell
Detroit, MI 48207

Chicago, IL, South Water Market:
Agricultural Marketing Service
Fruit and Vegetable Division
610 South Canal Street
Chicago, IL 60607
312-353-0111
Recorder: 312-353-0240

Cleveland, OH:
Market News Service
3800 Woodland Avenue
Cleveland, OH 44115
216-361-3392
Recorder: 216-361-9936

References

1. Anonymous. 1980. The market news service on fruits, vegetables, ornamentals, and specialty crops. Marketing Bulletin No. 61. USDA Agricultural Marketing Service, Washington, D.C. 26p.
2. Jackson, Peter A. 1980. Michigan Agricultural Statistics 1980. Michigan Agricultural Reporting Service, Lansing, MI. 84p.
3. Magoon, Charles E. 1979. Container Net Weights. United Fresh Fruit and Vegetable Association, Alexandria, VA. 4p.
4. Molendo, Edward. 1978. Michigan Vegetables 1972-1977. Michigan Agricultural Reporting Service, Lansing, MI. 25p.

Table 1. Marketable Yields of Vegetable Crops in Michigan.

Crop	Average yield	Good yield	Excellent yield
	Tons per Acre		
Asparagus	0.8	1	2
Beans, snap	2	4	5
Beets, red	10	12	15
Broccoli[1]	2.5	3.5	4
Cabbage, fresh market	7.5	10	20
Carrot, processing	30	35	40
Carrot, fresh market	8.5	15	17
Cauliflower	3.8	7	10
Celeriac	—	5	8
Celery	22.5	40	50
Corn, sweet	3	8	10
Cucumber, slicing	4	13	15
Cucumber, pickling, (machine harvest)	4.5	6.5	8
Cucumber, pickling (hand harvest)	12.5	16	18
Eggplant	8	10	12
Endive, escarole, leaf, bibb, romaine lettuce	6	8	12
Greens (mustard, turnip, collard, kale)	3	5	6
Horseradish	3	4	5
Leek	—	8	9
Lettuce, head	8.5	20	25
Muskmelon	4	8	10
Onions, dry	15	20	25
Onions, green	8	9	10
Parsnip	8	10	13
Pepper, green	4	10	13
Potato	12	17	22
Pumpkin	7	15	20
Radish[2]	2	3	5
Rhubarb[3]	10	15	18
Rutabaga	15	18	20
Spinach	4	6	7
Squash, summer	10	15	20
Squash, winter	7	10	15
Strawberry	3	5	8
Tomato, fresh market	5	12	20
Tomato, processing	19	25	35

[1]*Figures include primary heads and sideshoots. Center head production is about 70% of total production for most varieties.*

[2]*Tons/acre/crop. Radishes have 3 or 4 crops per year on the same ground.*

[3]*Figures given are for one cutting of green rhubarb. Red varieties usually yield about 50% less than green varieties. Some fields are harvested twice per year, with the second harvest producing 50-75% of the first.*

Table 2. Package Net Weights for Michigan Vegetable Crops.[1]

Crop	Containers	Net weight (pounds)
Asparagus	pyramid crates, loose pack	32
Beans, snap	1 bushel baskets and crates	26-31
Beets, red, bunched	crates holding 2 doz. bunches	36-40
Broccoli	1 1/9 bushel paper cartons	23
Cabbage	1 3/4 bushel crates and boxes	50-60
Carrots	1, 2 or 3 lb. plastic bags in 48 lb. masters	48
Cauliflower	2 layer box containing 12 to 16 heads	23
Celery	14 1/2 inch crates or boxes containing 2, 2 1/2, 3, 4, or 6 doz.	55-60
Sweet corn	crates or sacks containing 5 doz. ears	50
Cucumbers, slicing	1 or 1 1/9 bushel baskets, crates or cartons	50-55
Endive, escarole, romaine	1 1/9 bushel cartons and crates	25
Eggplant	1 1/9 bushel baskets, crates and paper cartons	20-25
Head lettuce	1 3/4 bushel cartons containing 18 to 24 heads	43-50
Horseradish	sacks	50-60
Leek	crates packed 2 doz. bunches	24-30
Muskmelon	crates or bushel baskets containing 12 to 16 melons	60-70
Onions, dry	1 bushel sacks	50
Onions, green	paper cartons holding 3-4 doz. bunches	10-16
Parsnip	cartons containing 12 1-lb. cello bags	12
Green peppers	1 or 1 1/9 bushel baskets, crates or cartons	28
Potato	100 lb. sacks, 50, 20, 10 lb. bags or cartons	100, 50, 20 or 10
Pumpkin	usually shipped bulk or in bulk boxes	
Radish	6 oz. film bags packed 30 to a carton, or 1 lb. film bags packed 14 to a carton	12-15
Rhubarb	cartons or crates, loose	20-30
Rutabaga	sacks or cartons	25 or 50
Spinach	1 or 1 1/9 bushels, cartons, or crates	20-25
Squash, summer	1/2 bushel crates or cartons	21
Squash, winter	1 1/9 bushel crates or cartons	42
Strawberry	16 quart crates	24
Tomato	cartons, loosepack	30
Turnip, root	1/2 bushel basket, cartons, film bags	25

[1]*The container sizes listed are common sizes used for vegetable crops grown and packed in Michigan. For some crops, such as tomato, many different types and sizes of containers are used. The sizes and net weights listed represent a commonly used size in such instances.*

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