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Michigan State University Extension Service

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Issued March 1994

8 pages

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AG FACTS

Cost of Producing Plums in Northwestern Michigan

By Myron P. Kelsey, James Bardenhagen and James Nugent¹

This cost evaluation of plum production in northwestern Michigan is a projection of costs developed through small group discussions with growers from Leelanau and Grand Traverse counties. In the discussions, growers described common growing and harvesting practices of average plum growers in the area. They also agreed on the size of plum acreage, the equipment and the cultural practices generally used by an average grower.

These figures are not the average cost of plum production for all growers in the state. Costs vary considerably by area and from farm to farm.

The data can help you develop costs and better evaluate your farm situation. Each of the appropriate tables in this report includes a "Your Farm" column for you to note your costs for a particular operation. Where costs cannot be determined, you may wish to adjust and substitute the study data.

The assembled data assume that equipment and labor are available for a hypothetical farm of 200 acres of diversified tree fruit, including 10 acres of plums. The data in Table 1 are presented for 10 acres of plums to make it easier to visualize many of the resource inputs.

LABOR COSTS

The full-time labor classification includes the working time of the operator and regular hired help devoted to plums. Operator labor is not considered a cash expense. But to allow for differences in the proportion of work performed by regular hired help, which is a cash expense, or by the operator, both have been included at the same rate. As a result, producers who do a major por-

tion of the work may have a lower cash labor cost than the figures indicate. This rate is a base rate of \$7 per hour plus Social Security, Worker's Compensation insurance and other fringes to equal \$9 per hour. Part-time labor was paid \$6 per hour including Social Security, Worker's Compensation and other fringes.

EQUIPMENT COSTS

Major factors considered in figuring equipment costs are initial cost, salvage value, years of life, annual usage, repair costs, insurance, interest, and operating expenses such as gas and oil. The hourly operating costs, which include only gas and oil and repairs for each piece of equipment, are given in Table 1 and are based on the direct use of the equipment. The overhead machinery costs on an hourly basis are also shown in Table 1, but are not included in the total variable costs. They are included on the first line of Table 3 in overhead costs.

VARIABLE COSTS

Variable costs are those that change directly with increases or decreases in the acreage of plums. Examples of such costs are spray material, fertilizer, hired labor and machinery operating costs.

Variable costs incurred in plum production are categorized by labor, machinery and materials in Table 1. Included in Table 1 are the details of hours and types of labor, machinery used and hours of use, and kinds and amounts of materials used by operation. If your costs for particular items are substantially higher than those shown, you need to analyze those components

closely to see if you can reduce them. A high cost for a particular component may be justified if it contributes to sufficiently higher yield or improved quality.

Variable costs incurred in harvesting an acre with estimated total production of 5 tons of plums are shown in Table 2. At this level, a custom harvest charge of 3 cents per pound or \$60 per ton, was computed. It is important to adjust this figure to reflect your farm costs since it may vary with production per acre and acres harvested. Such an adjustment has been made in Table 5 to reflect differences in production per acre.

OVERHEAD COSTS

The overhead or fixed costs of plum production (Table 3) include allocating machinery overhead on the basis of the proportion of total farm use in plums, interest on orchard investment, orchard depreciation and taxes. The details of orchard establishment cost are shown in Table 6 and Table 7.

The fixed costs of machinery are allocated to plums on the basis of hours of use relative to the total hours of equipment use on the farm. These are shown in columns 8 and 9 in Table 1 by operation, but are not included in the total of variable costs. Fixed costs on machinery include depreciation, interest on investment, insurance and housing costs. Interest on land and growing and establishment costs is charged at 10 percent. Fixed costs vary from farm to farm more than the variable costs shown in Table 1. Such costs include land acquisition and orchard establishment. The figures in Table 3 reflect two ways of acquiring an orchard. Possible sale value is one way to evaluate the orchard cost. Growers felt a 10-to 15-

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year-old orchard could possibly be purchased for \$2,250 per acre, which would be divided for depreciation into \$1,000 land value and \$1,250 orchard value. If a grower establishes an orchard, current establishment costs illustrated in Tables 6 and 7 are more appropriate to use. These costs look high primarily due to interest costs which frequently farmers do not consider.

Evaluate your farm situation and decide whether to consider fixed costs as part of the total cost for decision-making purposes. For example, orchard overhead is a fixed cost if you own the orchard outright, but a variable cost if you rent.

PRODUCTION COSTS

Per acre yields are very important in determining production costs per ton (Table 5). In computing per ton costs, it is assumed that preharvest costs per acre, such as spraying, pruning, cultivating, etc., do not vary greatly, regardless of the yield. Custom harvest rates are charged at

3 cents per pound harvested at the 5 ton per acre rate. It is assumed that the total variable and fixed costs for an owner-operator of a harvester varies with an increase or decrease in yield. Therefore, harvest costs per pound in Table 2 are shown to be the same at all yield levels. In practice, costs per ton decreases for yields over 5 tons and increases for yields below 5 tons per acre (Table 5).

In addition, overhead costs for interest on orchard value and depreciation will vary considerably from farm to farm, depending on when the orchard was planted. These costs include an estimated 1992 establishment cost, so they may overstate actual costs on currently producing orchards. You are encouraged to substitute your land and orchard acquisition or establishment costs in these tables.

ESTABLISHMENT COSTS

Tables 6 and 7 illustrate current establishment costs for a plum orchard. Individual cash costs will

vary widely, depending on the site preparation and the cultural practices needed to establish the orchard.

The first column of Table 7 repeats the costs per year shown in Table 6. In the second column, an interest charge of 10 percent is calculated on the land investment of \$1,000 per acre, one-half year's interest charge at 10 percent on the current growing year cost, and an interest cost on the prior year's accumulated cost at 10 percent in the last column.

The final accumulated cost of year five is used in Table 3 to calculate an operating year's depreciation of the establishment cost and interest on the establishment cost. If you purchase an orchard, substitute the purchase cost for the establishment cost. Generally the sale value of an orchard is considerably less than the establishment cost because both sellers and buyers tend to undervalue the costs involved in orchard establishment.

Table 1. Variable Growing Cost for 10 Acres of Plums, Northwestern Michigan, 1992.

Operation	Labor			Equipment	Machinery					Materials			Your Farm
	Labor (Hrs.)	Wage Rate	Cost		Hours of Use	Unit Var. Cost	Total Var. Cost	Fixed Unit Cost	Total Fixed Cost	Item	Cost per 10 Acres	Total Variable Cost	
Trimming every 2 years --average cost	5	\$9.00	\$45.00	Hand pruning equipment	5	\$0.04	\$0.20	\$0.20	\$1.00			\$45.20	
Brush removal	1	\$9.00	\$9.00	Tractor (60 hp) Brush rake	1 1	\$6.91 \$1.71	\$6.91 \$1.71	\$9.64 \$4.02	\$9.64			\$17.62	
Fertilizer: nitrogen	2	\$9.00	\$18.00	Tractor (60 hp) Fertilizer spread	2 2	\$6.91 \$1.04	\$13.82 \$2.08	\$9.64 \$5.78	\$19.28 \$11.56	33-0-0:300 lb/A @ 190/ton	\$285.00	\$318.90	
Fertilizer: potash (every other year)--annual cost	2	\$9.00	\$18.00	Tractor (60 hp) Fertilizer spread	2 2	\$6.91 \$1.04	\$13.82 \$3.75	\$9.64 \$5.78	\$19.28 \$11.56	100 lb 0-0-60/A @ 151/ton	\$75.50	\$111.07	
Lime (3 ton every 5th year)--annual cost										3 ton/A applied @ \$21/ton for 5 yrs	\$126.00	\$126.00	
Weed control (spray twice)	8	\$9.00	\$72.00	Tractor (60 hp) Weed sprayer	6 6	\$6.91 \$4.88	\$41.46 \$29.28	\$9.64 \$8.87	\$57.84 \$53.22	Material cost @ \$7.25/A	\$145.00	\$287.74	
Mowings (3 times)	10	\$9.00	\$90.00	Tractor (80 hp) Rotary mower	10 10	\$7.02 \$3.16	\$70.20 \$31.60	\$9.37 \$3.39	\$93.70 \$33.90			\$191.80	
Spray program (8 sprays)	16	\$9.00	\$144.00	Tractor (80 hp) PTO sprayer	16 16	\$7.02 \$4.98	\$112.32 \$79.68	\$9.37 \$12.15	\$149.92 \$12.15	Insect & fung \$157.47/A	\$1,574.70	\$1,836.00	
Plum borer (spray every 3 years)	3	\$6.00	\$18.00	Tractor (80 hp) High press spray	2 2	\$7.02 \$0.53	\$14.04 \$1.06	\$9.37 \$32.41	\$18.74 \$64.82	Lorsban 3 qt/A @ \$48/gal/ application	\$360.00	\$131.03	
Mouse baiting	1	\$9.00	\$9.00	Tractor (80 hp) Fertilizer spread	1 1	\$7.02 \$1.04	\$7.02 \$1.04	\$9.37 \$5.78	\$9.37 \$5.78	Zinc phosphide 7#/A, @ \$.50 1/3A	\$11.67	\$28.73	
Pest management service @ \$15/A											\$150.00	\$150.00	
Management & labor supervision	25	\$9.00	\$225.00									\$225.00	
Pick-up operation (miles)				Pick-up	400	\$0.16	\$64.00	\$0.38	\$152.00			\$64.00	
Totals	73								\$910.03			\$3,533.09	

Table 2. Variable Harvest Cost for 10 Acres of Plums, 5 Tons per Acre, Northwestern Michigan, 1992

	Unit	Price	Total	Your Farm
Full-time labor	40.00	\$9.00	\$360.00	_____
Custom shaking @ 3 cents/lb.	50 ton	\$0.03	\$3,000.00	_____
Plum tax	50 ton	\$4.50	\$225.00	_____
Total variable harvest cost			\$3,585.00	_____
Total variable harvest cost per ton			\$71.70	_____

Table 3. Overhead Cost for Growing and Harvesting 10 Acres of Plums, 5 Tons per Acre, Northwestern Michigan, 1992

	Purchased Orchard		Established Orchard		Your Farm
	10 Acres	Per Acre	10 Acres	Per Acre	
Equipment, overhead (depreciation + interest)	\$910.03	\$91.00	\$910.03	\$91.00	_____
Interest on land (\$1,000/A @ 10%)	\$1,000.00	\$100.00	\$1,000.00	\$100.00	_____
Property taxes (@ \$35/A)	\$350.00	\$35.00	\$350.00	\$35.00	_____
Interest on average orchard establishment cost of 1/2 \$3,633/A @ 10%			\$1,816.40	\$181.64	_____
Depreciation of establishment cost (20 yr)			\$1,816.40	\$181.64	_____
Interest on average purchased orchard cost of 1/2 \$1,250/A @ 10%	\$625.00	\$62.50			_____
Depreciation of purchased orchard cost (20 yr)	\$625.00	\$62.50			_____
Interest on 1/2 growing and harvest cost @ 10%	\$355.32	\$35.53	\$355.32	\$35.53	_____
Total overhead cost	\$3,865.35	\$386.53	\$6,248.15	\$624.81	_____
Total cost per ton	\$77.31	\$77.31	\$124.96	\$124.96	_____

Table 4. Total Growing and Harvesting Cost for 10 Acres of Plums, 5 Tons per Acre, Northwestern Michigan, 1992

	Purchased Orchard		Established Orchard		Your Farm
	10 Acres	Per Acre	10 Acres	Per Acre	
Variable growing cost	\$3,533.09	\$353.31	\$3,533.09	\$353.31	_____
Variable harvest cost	\$3,585.00	\$358.50	\$3,585.00	\$358.50	_____
Overhead cost of established orchard			\$6,248.15	\$624.81	_____
Overhead cost of purchased orchard	\$3,865.35	\$386.53			_____
Total cost	\$10,983.44	\$1,098.34	\$13,366.24	\$1,336.62	_____
Total cost per ton	\$219.67	\$219.67	\$267.32	\$267.32	_____

Table 5. Effect of Varying Yield on Cost Per Ton for Plums, Northwestern Michigan, 1992

Yield Ton/A	Variable		Total Variable Cost	Your Farm	Purchased Orchard		Established Orchard		Your Farm
	Growing Cost	Harvest Cost			Overhead Cost	Total Cost	Overhead Cost	Total Cost	
2	\$176.65	\$90.00	\$266.65	_____	\$193.27	\$459.92	\$312.41	\$579.06	_____
3	\$117.77	\$84.00	\$201.77	_____	\$128.85	\$330.62	\$208.27	\$410.04	_____
4	\$88.33	\$77.50	\$165.83	_____	\$96.63	\$262.46	\$156.20	\$322.03	_____
5	\$70.66	\$71.70	\$142.36	_____	\$77.31	\$219.67	\$124.96	\$267.32	_____
6	\$58.88	\$65.50	\$124.38	_____	\$64.42	\$188.80	\$104.14	\$228.52	_____
7	\$50.47	\$59.50	\$109.97	_____	\$55.22	\$165.19	\$89.26	\$199.23	_____
8	\$44.16	\$53.50	\$97.66	_____	\$48.32	\$145.97	\$78.10	\$175.76	_____
9	\$39.26	\$48.00	\$87.26	_____	\$42.95	\$130.21	\$69.42	\$156.68	_____
10	\$35.33	\$42.50	\$77.83	_____	\$38.65	\$116.48	\$62.48	\$140.31	_____

Table 6. Establishment Cost for 10 Acres of Plums (Excluding Interest), Northwestern Michigan, 1992

		Your Farm
Site preparation		
General land development and taxes (\$250/A)	\$2,500.00	_____
Planting year (year one)		
Ground preparation: 4 hr labor @ \$9/hr & equipment @ \$21.40/hr	\$121.60	_____
Marking: 5 hr @ \$9	\$45.00	_____
10 hr @ \$6	\$60.00	_____
Trees: 125/A @ \$5.25	\$6,562.50	_____
Custom tree planting @ 25 cents/tree	\$312.50	_____
Prune: 10 hrs @ \$9	\$90.00	_____
Spraying (3x):		
8 hr labor @ \$9	\$72.00	_____
Material @ \$6/A/spray	\$240.00	_____
Equipment @ \$51.40/10 A/spray	\$205.60	_____
Cover crop: machinery, material and labor @ \$15/A	\$150.00	_____
Mouse bait: machinery, material and labor @ \$4.75/A	\$47.50	_____
Fertilizer: equipment & labor	\$64.74	_____
50 lb potash, 125 lb phosphorus, 70 lb A.N./A	\$232.25	_____
Herbicide spray (2x) equipment and labor	\$208.57	_____
1 qt Paraquat/A sprayed-spray 1/4 area	\$37.50	_____
Management: 5 hr @ \$9	\$45.00	_____
Real estate taxes @ \$35/A	\$350.00	_____
Total	\$8,844.76	_____
Growing cost (year two)		
Prune: 10 hr @ \$9	\$90.00	_____
Tree replacement: 3 hr @ \$6		
50 trees @ \$5.25 + equipment @ \$17/hr	\$331.50	_____
Herbicide spray: equipment, labor, materials	\$208.57	_____
Insect and disease control (4x): equipment, labor, materials	\$517.60	_____
Mow (2x): labor and equipment @ \$10.65/A	\$213.00	_____
Mouse control: equipment, labor, maintenance	\$47.50	_____
Fertilizer: equipment and labor	\$64.74	_____
100 lb potash, 117 lb ammonium nitrate/A	\$197.50	_____
Management: 5 hr @ \$9	\$45.00	_____
Real estate taxes @ \$35/A	\$350.00	_____
Total	\$2,065.41	_____

Table 6 (continued)

		Your Farm
Growing cost (year three)		
Tree replacement: 3 hr @ \$6 40 trees @ \$5.25 + equipment @ \$17/hr	\$279.00	_____
Herbicide spray: equipment, labor, materials	\$208.57	_____
Insect and disease control (4x): equipment, labor, materials	\$597.60	_____
Mow (2x): labor and equipment @ \$10.65/A/m	\$213.00	_____
Mouse control: equipment, labor, materials @ \$6.44/A	\$47.50	_____
Fertilizer: equipment and labor 100 lb potash, 165 lb ammonium nitrate/A	\$64.74 \$245.50	_____ _____
Management: 5 hr @ \$9	\$45.00	_____
Real estate taxes @ \$35/A	\$350.00	_____

Total	\$2,050.91	_____

Growing cost (year four)		
Prune: 20 hr @ \$9	\$180.00	_____
Tree replacement: 7 hr @ \$9 30 trees @ \$5.25 + equipment @ \$17/hr	\$215.00	_____
Herbicide spray: equipment, labor, materials	\$208.57	_____
Insect and disease control (5x): equipment, labor, materials	\$747.00	_____
Mow (2x): labor and equipment \$10.65/A/m	\$213.00	_____
Mouse control: equipment, labor, materials @ \$4.75/A	\$47.50	_____
Fertilizer: equipment and labor 100 lb potash, 188 lb ammonium nitrate/A	\$64.74 \$268.50	_____ _____
Management: 5 hr @ \$9	\$45.00	_____
Real estate taxes @ \$35/A	\$350.00	_____

Total	\$2,339.31	_____

Growing cost (year five)		
Tree replacement: 2.5 hr @ \$6 20 trees @ \$5.25 + equipment @ \$17/hr	\$235.00	_____
Herbicide spray: equipment, labor, materials	\$208.57	_____
Insect and disease control (4x): equipment, labor, materials	\$747.00	_____
Mow (2x)	\$213.00	_____
Mouse control: equipment, labor, materials @ \$4.75/A	\$47.50	_____
Fertilizer: equipment and labor 100 lb potash, 250 lb phosphorus, 235 lb A.N.	\$64.74 \$559.25	_____ _____
Management: 5 hr @ \$9	\$45.00	_____
Real estate taxes @ \$35/A	\$350.00	_____

Total	\$2,470.06	_____

Total of 5 years	\$20,270.45	_____

Table 7. Total Establishment Costs, Including Interest, for 10 Acres of Plums, Northwestern Michigan, 1992

Year	Growing Cost	Your Farm	Interest	Your Farm	Annual Total	Your Farm	Accumulated Your CostFarm
Site preparation	\$2,500.00	_____	\$1,125.00	_____	\$3,625.00	_____	\$3,625.00
Planting year	\$8,844.76	_____	\$1,804.74	_____	\$10,649.50	_____	\$14,274.50
Year two	\$2,065.41	_____	\$2,530.72	_____	\$4,596.13	_____	\$18,870.63
Year three	\$2,050.91	_____	\$2,989.61	_____	\$5,040.52	_____	\$23,911.15
Year four	\$2,339.31	_____	\$3,508.08	_____	\$5,847.39	_____	\$29,758.54
Year five	\$2,470.06	_____	\$4,099.36	_____	\$6,569.42	_____	\$36,327.95

Totals	\$20,270.45	_____	\$16,057.50	_____	\$36,327.95	_____	



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