FINANCIAL AND ECONOMIC COMPARISON BETWEEN ESTABLISHING A STANDARD- AND HIGH-DENSITY SWEET CHERRY ORCHARD IN OREGON, USA

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Abstract

The economics of a standard-density *Prunus avium* 'Bing' orchard on Mazzard rootstock, planted on a 4.88- by 6.1-m spacing (337 trees per ha) was compared to a high-density 'Bing' orchard on Gisela 6 rootstock planted on a 3- by 4.9-m spacing (672 trees per ha). The price of the fruit was set at US$1.54 per kg. The full production yield is 13,450 kg per ha in a standard-density orchard and 15,243 kg per ha in a high-density orchard. Although planting the high-density orchard requires $2,943 per ha more in cash cost than the standard-density orchard, the benefits are realized when all economic costs are included. At the end of the establishment period (5 years for a high-density orchard, 8 years for a standard-density orchard) the standard-density orchard will cost $9,269 more per ha than the high-density orchard. The break-even year in which gross income covers all previous years' economic costs is year 8 for the high-density orchard and year 15 for the standard-density orchard. The return on investment over a 25-year period shows both systems returning a significant rate, with the high-density returning 22-percent, compared to the standard-density with a 16-percent rate of return on investment.

INTRODUCTION

In recent years there have been numerous advances in the sweet cherry industry that have made growing sweet cherries more interesting and potentially profitable to the producer. Included in these advancements are new rootstocks that increase precocity, large fruited, rain tolerant cultivars that ripen outside the standard harvest window and new training systems that facilitate rapid harvest. However, caution is advised when considering sweet cherries because those technological advances come at a price and the prudent decision is to assess the cost-benefits of the various options including the option of planting a standard- versus high-density orchard. Planting a standard-density orchard is less expensive and requires less management skills. However, the high-density orchard can result in greater economic returns at a substantially higher financial risk if growers do not make prudent decisions when considering orchard renewal.

MATERIALS AND METHODS

The typical sweet cherry orchard in Wasco County, Oregon, as used in this budget, consists of 40 total productive ha. Bearing area includes 22 ha of mature, standard-density, fresh market sweet cherries, 6 ha of high-density, fresh market sweet cherries, 8 ha of mature, standard-density brine market sweet cherries, and approximately 10 percent, or 4 ha, of the orchard under establishment. It is assumed this farm complies with the Integrated Fruit Production (IFP) program established by the Wasco County Fruit and Produce League. For information in obtaining a copy of the IFP guidelines, please contact the Wy'East RC&D at www.wyeastrcd.org.

Assumptions

In the preparation of this analysis, several assumptions were made that provided a basis for the comparison of a standard-density and high-density sweet cherry orchard. These assumptions include:

1. Remove 1 ha of older orchard each year and plant either to a standard- or high-density sweet cherry orchard. A standard-density orchard consists of 337 trees per ha with a 4.88 x 6.1 m spacing. A high-density orchard consists of 672 trees per ha with a 3 x 4.9 m spacing. However, with both systems, about 11 percent of the trees are pollinizers.
2. The standard-density orchard is trained to a Steep Leader system while the high-density orchard is trained to a central leader system.
3. Sweet cherry price is US$1.54 per kg or $1,543 per t.
4. The full production yield in a standard-density orchard is 13,450 field run kg per ha and 15,243 kg in a high-density orchard. Commercial yields begin in year 4 in the standard-density orchard and full production is reached in year 8. In the high-density orchard commercial production begins in year 3 and reaches full production in year 5.
5. All labor is hired at a rate of $10/hr and $3.60/10 kg bucket to harvest cherries, which includes worker's compensation, unemployment insurance, and other labor overhead expenses. Housing for summer labor is valued at $40,000 and has a productive life of 30 years. This unit houses 10 people. Utilities, repairs, and maintenance costs for these units are $3,150/yr, or $111/ha. Foreman housing is also provided year-round at no cost to the employee and valued at $600/mo. The foreman housing is treated as a non-cash opportunity cost to the owner. All labor and foreman housing charges are split equally across the 28.32 hectares.
6. Price inflation for the time period of this analysis was ignored.
7. Income tax consequences are also ignored for this analysis.

RESULTS AND DISCUSSION

Table 1 shows the financial and economic advantages to establish a high-density sweet cherry orchard over a 25-year period. Although planting the high-density orchard requires $2,943 per ha more in cash cost than the standard-density orchard the benefits are realized when all economic costs are included. At the end of the establishment period (5 years for a high-density orchard and 8 years for a standard-density orchard) the standard-density orchard will cost $9,269 more per ha than the high-density orchard. The break-even year in which the grower realizes a positive cash flow (gross income exceeding cash

expenses) is in year 4 as compared to 6 years in a standard-density orchard. However, when all economic costs are included the break-even year increases for a standard-density orchard to 7 years and remains at 4 years with the high-density orchard. Moreover, the break-even year in which gross incomes cover all previous year's economic costs is 8 years for the high-density orchard and 15 years for the standard-density orchard. This is significant in that economic profits can be realized 7 years earlier with the high-density system using our assumptions in this analysis. The return on investment over a 25-year period shows that both systems return a significant rate with the high-density returning 22 percent, as compared to the standard-density with 16 percent rate of return on investment. Figure 1 shows the major cost components in relation to total cash costs when establishing a standard-density orchard. Hired labor represents 47 percent of the total cash costs to establish this orchard. Fertilizer and chemicals are the second largest cost item with 15 percent of the total cash costs. Machine costs, which includes fuel, oil and repairs, are 11 percent of the cash costs. Tree cost is only 5 percent of the total cash costs and remaining cost items encompass 22 percent of the total cash costs. Figure 2 shows the major cost components in relation to total cash costs when establishing a high-density sweet cherry orchard. Hired labor represents 39 percent of the total cash costs to establish this orchard. Tree cost is 13 percent and fertilizer and chemicals are the third largest cost item with 10 percent of the total cash costs. Machine costs, which includes fuel, oil and repairs, are 8 percent for the cash costs and the remaining cost items encompass 30 percent of the total cash costs.

CONCLUSIONS

In the past, most growers renewed orchards only when production levels no longer covered the cost of production. Today, however, technological advances in fruit, rootstock, and training system attributes can result in greater gross revenues and increased interest in replacing old stands with a modern high-density orchard.

High-density orchards can offer higher returns that are obtained earlier in the life of the orchard. These early returns erode interest costs that can greatly impact the profitability and feasibility of an orchard investment. The trade off, however, is higher risk due to larger up-front costs and significantly greater management expertise requirements. In contrast, there are many factors in establishing a standard-density orchard, such as lower establishment costs and a return on investment greater than the cost of borrowing money, which makes this investment also attractive. Growers must evaluate all possible options and circumstances in orchard establishment that compliment and strengthen their business plan.

Tables

Table 1. Financial comparisons to establish a high-density versus a standard-density orchard.

	Standard-Density Orchard	High-Density Orchard	Advantages Of a High-Density Orchard
Cash Required to Establish a Ha of			

Orchard	$20,960	$23,901	$2,941
Total Economic Costs Remaining at the End of Establishment Period	$42,035	$32,952	$(9,083)
Break-even Year for a Positive Cash Flow	Year 6	Year 4	2 Years
Break-even Year for a Positive Economic Cash Flow	Year 7	Year 4	3 Years
Break-even Year to Cover All Previous Year's Economic Costs	Year 15	Year 8	7 Years
Return on Investment for a 25-Year Period	12.61%	22.06%	9.45%

Figures

Fig. 1. Cash costs to establish a standard-density sweet cherry orchard the first eight years of establishment.

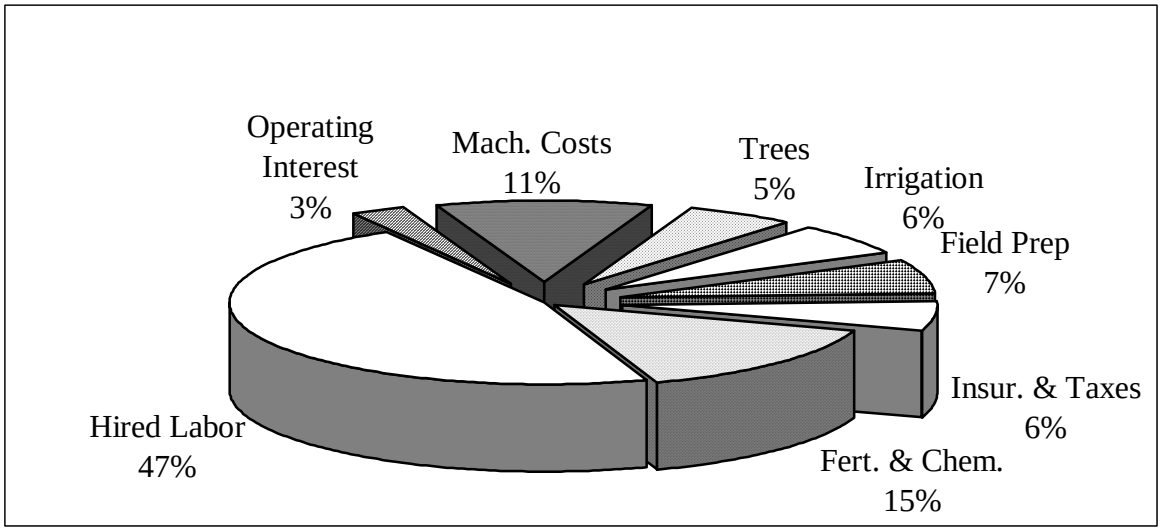
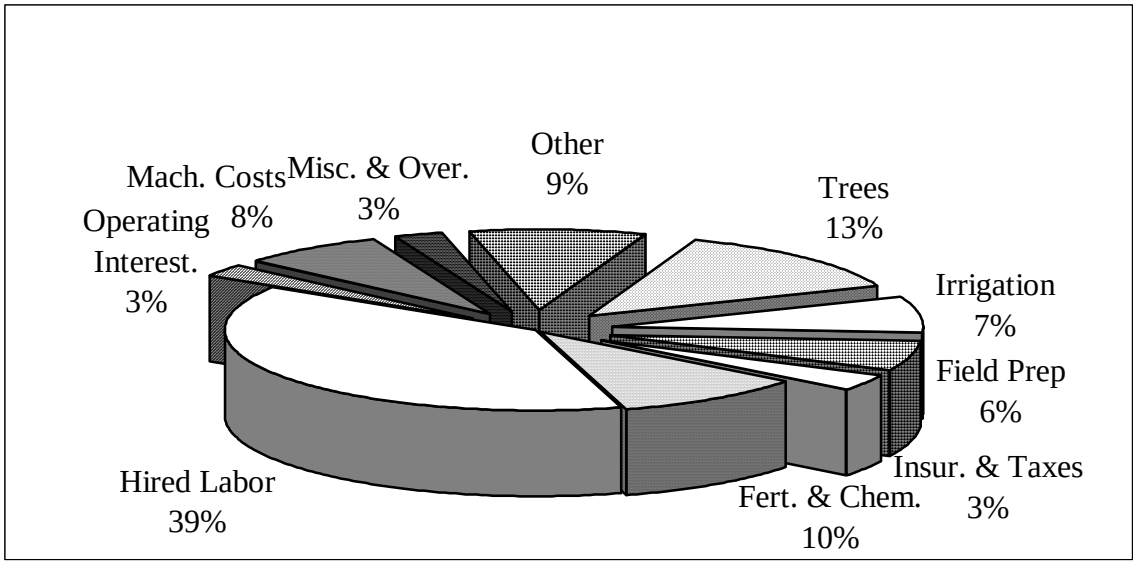


Fig. 2. Cash costs to establish a high-density sweet cherry orchard the first five years of establishment.


Other
9%
Misc. & Over.
3%
Mach. Costs
8%
Operating
Interest.
3%
Trees
13%
Irrigation
7%
Field Prep
6%
Insur. & Taxes
3%
Fert. & Chem.
10%
Hired Labor
39%