Vineyard Economics

To be successful, a prospective grape grower should be aware of the expenses and labor involved in establishing and operating a vineyard. Vineyard establishment costs will vary with costs associated with land preparation, cost of the grapevines, the training system and cost of the trellising materials. The cost to operate the vineyard will vary with the labor, equipment and materials required to perform the various cultural practices such as pruning, fertilizing, weed control and ground cover management, insect and disease control, canopy management, and harvesting. Basic equipment needed will be a tractor, 5-6 ft mower, fertilizer spreader, a low operating pressure herbicide sprayer, and a higher pressure sprayer (preferably an air blast) for applying insecticides and fungicides. The grapevines can be planted with the aid of either a three-point (3-pt) power take off (PTO) driven auger with a 12-inch minimum diameter (14-16-inch diameter is preferred) or with a tree planter. Both could be rented or borrowed. For installing the trellis system, post driver (may be rented or borrowed) should be used, but an auger may be needed to drill pilot holes for the longer end posts.

A single tractor could be used if it has sufficient horsepower (HP) to operate an air blast sprayer for applying insecticides and fungicides, but fuel consumption will be higher when performing the lighter tasks. Generally, a 35 HP tractor is sufficient for mowing, herbicide spraying and other light cultural practices, however, a 50 HP tractor with cab is preferred for operating an air blast spray. A larger tractor would be needed for land preparation (disking, plowing, subsoiling) and planting with a tree planter, but this work could be hired or rented to eliminate the need or purchasing the implements. If irrigation is considered it will increase the cost of the initial investment.

Iowa State University Extension developed three downloadable, interactive work books on ***Estimated Vineyard Establishment Costs*** that are posted on the Agricultural Marketing Resource Center (AgMRC) website: thtp://www.agmrc.org/commodities__products/fruits/wine/winery_and_vineyard_feasibility_workbooks.cfm. These workbooks were used to generate the information on the establishment and operation of 1, 2 and 5 acre vineyards trained to a single curtain bilateral cordon (high-wire cordon), Geneva double curtain, and a mid-wire cordon with vertical shoot positioning (VSP) under vineyard layout, production potential, labor and machinery operating expenses assumptions presented in **Table 6**. Even if you perform all the labor yourself, your time is valuable and needs to be charged to the operation. In addition, interest or lost opportunity cost was assessed at 6% for 6 months on current year expenses and for 12 months on any carryover expenses, and a land charge of $165 per acre was assessed to cover other expenses such as property tax.

Hand tools for trellis construction and for performing cultural practices are items that are purchased for the first planting of grapevines or you may already have or be able to borrow some of them. A listing of the tools and cost of these tools and options are listed in **Table 7.** For the cost of establishment and operating costs summaries for one, 2 and 5 acre vineyards presented in **Tables 12-20**, tools were purchased for the first acre. Purchase of tractors, sprayers and other machinery was not included in the production budgets because of the potential option of purchasing new or used equipment and prices vary considerably.

The largest expense in the first year are for vines and trellising materials. Cold hardy cultivars will cost from $2.80 to $4.15 per vine for Grade 1 (1-1) and Grade 1 extra (1-X) vines in quantities sufficient for planting one or more acres. The cost per acre for grapevines priced at $2.80, $3.50 and $4.15 for vineyards trained to a high-wire cordon, Geneva double curtain and mid-wire cordon with VSP are shown in **Table 8**. **Table 8** also lists the cost of bamboo stakes and grow tubes that are often used to train vines during the first year. For the estimated establishment and operating cost budgets presented in **Tables 12-20**, a price of $3.50 per vine was used, and grow tubes were included as a cultural option.

The cost of trellis materials per acre for vineyards trained to the high-wire cordon, Geneva double curtain and mid-wire cordon with VSP is presented in **Table 9** comparing the use of the H-braced end post system to the earth anchor end post system based on the vineyard layout assumptions presented in **Table 6.** For the estimated establishment and operating cost budgets presented in **Tables 12-20**, the H-brace system was used. Trellising cost were based on the use of pressure-

treated pine post (4" x 8' line post and 6" x 10' end post) installed with a post driver leaving 6 feet extending above the ground. If an auger is used to install the line post, 9 foot post should be used at an additional expense. For shorter rows, 3.5" diameter line post and 5" diameter end post could be used to reduce costs. Alternative materials, such as native timber, metal or synthetic posts are an option. It is recommended that the trellis be built at planting time. A trellis system could be established the second year, however some cultivars can exceed eight feet the first year and grow beyond training stakes.

If everything goes well, the vineyard should come into production by the third year with a partial crop and full crop by the fifth year. When a vineyard comes into production, insect and disease control becomes more intensive to protect the fruit, and some form of protection may be need to keep birds and mammals from feeding on the berries. Bird netting is a major cultural expenditure and options for grapevines trained to a high-wire cordon, Geneva double curtain and mid-wire cordon with VSP are presented in **Table 10**. **Table 10** also presents harvest contain options that would need to be purchased beginning in the first year of production and can be spread out until the vineyard reaches full production, hopefully by the fifth year. For the estimated establishment and operating cost budgets for 2 acre (**Tables 13, 16, 19**) and 5 acre (**Tables 14, 17, 20**) vineyards, harvest containers were purchased for the first acre on the assumption that the contained would be reused for each additional acre. Full production for grapevines trained to the high-wire cordon (**Tables 6, 12-14**) was estimated at 5 tons per acre or 18.3 lbs per vine. Since grapevines trained to the Geneva double curtain have the potential to produce 60% higher yields than single curtain vines, full production was set at 29.3 lbs per vine or 6.7 tons per acre (**Tables 6, 15-17**). For vines trained to the mid-wire cordon with VSP, full production of 18.3 lbs per vine was used as with the high-wire cordon vines, but with more vines per acre, full production was estimated at 5.5 tons per acre (**Tables 6, 18-20**). For each training system production in the third and fourth year was set at approximately 40% and 80% full production (**Table 6**).

It is prudent to select cultivars that are in demand by local wineries and consumers. Also check with local wineries to determine if a minimum amount of the cultivar you intend to grow will be required. Current prices for wine grapes range from $1,000 to $1,500 per ton with some high-in-demand, high quality and clean new cultivars bringing as much as $2,000 per ton. For the estimated establishment and operating cost budgets presented in **Tables 12-20**, $1,500 per ton was used. For the budgets, harvest was on a piece-work basis set at $1.50 per lug or $100 per ton or $1.63 per lug and $109 per ton with overhead (**Table 6**). **Table 11** breaks down the annual labor and machinery requirements, and materials cost per acre by cultural practice for mature vineyards trained to a high-wire cordon, Geneva double curtain and mid-wire cordon with VSP. Not included in the labor expense is pest management scouting and grape cultivar maturity testing because these practices will vary for the time from bud break to maturity for a cultivar, and the number of cultivars. Pest management scouting can consume one hour per week per acre and maturity testing could take up to an hour per week per cultivar following veraison.

Based on the assumptions used to develop the estimated establishment and operating cost budget summaries, first year accumulated cost per acre was $9,272 for the high-wire cordon (**Table 12**), $9,635 for the Geneva double curtain (**Table 15**), and $11,408 for the mid-wire cordon with VSP (**Table 18**). However, the pre-plant year budget was developed based on the assumption that no soil amendments were required. For each scenario, income covered the annual expenses in the fourth year (**Tables 12-20**). For one acre vineyards, return on the investment was reached in the Year 10 on the high-wire cordon (**Table 12**), Year 8 on the Geneva double curtain (**Table 15**), and Year 9 on the mid-wire cordon with VSP (**Table 18**). Increasing the size of the vineyard to 2 or 5 acres shortened the time when the vineyards became profitable.

[Insert Tables 6 – 20]

Based on the estimated establishment and operating cost budgets developed for vineyards trained to a single curtain bilateral cordon (high-wire cordon), Geneva double curtain (GDC) and mid-wire cordon with VSP, it takes considerable time and financial commitment to establish and operate a vineyard, and several years before the vineyard becomes profitable on its own. Our estimates indicate that it will take approximately 240 to 290 hours (Years 0-2) to establish a one-acre vineyard if planting and trellising are done in the same year, and it takes approximately 133 to 190 hour per year to maintain an established vineyard.

Vineyard Best Management Practices – Time and Financial Commitment:

Rank your level of time commitment per acre or ability to hire labor for:

Management area: **Time Commitment per acre**	**Best Practice**	**Minor Adjustments Needed**	**Concern Exists: Examine Practice**	**Need Improvement: Prioritize Changes**
Years 1-2 (Site preparation, planting & trellising	Can commit 240-290 hours for planting, trellising, training & cultural practices	Can commit 210-240 hours for planting, trellising, training & cultural practices	Can commit 180-210 hours for planting, trellising, training & cultural practices	Cannot commit 180 hours for planting, trellising, training & cultural practices
Years 3 and beyond	Can commit more than 140 hours for pruning, shoot thinning, shoot positioning, weed and pest control, and harvest per year.	Can commit 120-140 hours for pruning, shoot thinning, shoot positioning, weed and pest control, and harvest per year.	Can commit 100-120 hours for pruning, shoot thinning, shoot positioning, weed and pest control, and harvest per year.	Cannot commit more than 100 hours for pruning, shoot thinning, shoot positioning, weed and pest control, and harvest per year.

Our estimates indicate that it will cost from $20,000 to $21,000 to bring one acre of vineyard into bearing in Year 3, and then an additional $4,000 to $5,000 per year from year 4 and beyond to maintain it excluding bird netting and harvest containers. A person can assume that it will cost approximately $660 per acre in the year prior to planting (Year 0) to prepare the site - soil preparation, soil testing and cover cropping. If soils need any soil amendments (lime, sulfur, phosphorous, potassium, magnesium, or a micro-nutrient) to optimize conditions, it would increase the cost of establishment in Year 0. In Year 1, the cost of grapevines and trellising materials are the major expense. If a person raises their own vines from cuttings, they can reduce the cost for the vines. However, one should remember that all patented cultivars cannot be propagated without written consent of the patent holder and royalties paid to them. It is best to purchase patented cultivars from nurseries that are licensed to propagate them.

The estimated cost of the trellis systems were based on the use of pressure-treated pine post. If a person is able to use alternative materials for line and end post, one may cut down on the cost of trellis construction. In doing this, one must account for the strength and longevity of alternatives as well as labor involved in accessing the alternatives.

Year 2 should be devoted to training the grapevines to prepare them for producing a partial crop in Year 3. Pest control becomes more important and should include a good weed control program to minimize competition for water and nutrients, and controlling diseases and insects that attack the foliage. Scouting the vineyard on a regular basis will enable you to identify any disease or insect issues before they become a problem. If all goes well, the vineyard can be brought into production in Year 3. Once in production, controlling diseases and insects that attack the fruit must be considered and increased pest control measure undertaken. Summer canopy management practices (shoot thinning, shoot positioning and maybe cluster thinning) and dormant pruning will add to the financial commitment for operating the vineyard.

Vineyard Best Management Practices – Time and Financial Commitment:

Rank you level of financial commitment per acre per year for:

Management area: **Financial commitment per acre per year.**	**Best Practices**	**Minor Adjustments Needed**	**Concern Exists: Examine Practice**	**Needs Improvement: Prioritize Changes Here**
Year 0	$500-$700 for site preparation	$300-$500 for site preparation	$300-$250 for site preparation	Less than $250 for sit preparation
Year 1 (Planting and trellising)	$8,400-$11,000 for planting, trellis construction, & cultural practices	$7,000-$8,000 for planting and trellis construction, & cultural practices	$6,000-$7,000 for planting and trellis construction, & cultural practices	Less than $5,000 for planting and trellis construction, & cultural practices
Year 2 (Training, weed and pest control)	$2,200-$2,500 for labor, weed & pest control, and interest	$2,000-$2,200 for labor, weed & pest control, and interest	$1,200-$1,800 for labor, weed & pest control, and interest	Less than $1,000 on labor, weed & pest control, and interest
Years 3 & beyond (Fruiting years: vine management, weed & pest control, harvest)	$4,000-$5,000 for labor for pruning, vine management, weed & pest control, harvest, and interest.	$3,500-$4,000 for labor for pruning, vine management, weed & pest control, harvest, and interest.	$2,500-$3,500 for labor for pruning, vine management, weed & pest control, harvest, and interest.	Less than $2,5 00 for labor for pruning, vine management, weed & pest control, harvest, and interest.