

Term Project - HORT 3020

Design and Management of a Fruit Farm

Your mission is to design a fruit farm on paper, and provide a discussion of its management in the format presented below. An economic analysis, using an Excel spreadsheet, is also required, and there are spreadsheets for tree crops (e.g., apple and peach), vine crops (grapes), and strawberries available for your use. A combination of crops on one farm could be attempted, but be advised that this will require much more work on your part, and may not increase the amount you learn in proportion to time spent.

Choosing a crop for your term project is *one of the most important decisions you will make!* Pick a crop that you are especially interested in learning about, or it will be a long, long effort putting this project together. It will be your responsibility to become intimately familiar with the cultural practices, diseases and pests, major cultivars and rootstocks, and other aspects of your crop's production. The information presented for each crop in the textbook (or web site) is a good starting point; see the references listed at the end of the chapter for more detailed information on your crop (or contact me).

Project Outline

All term projects should use the following format. In addition to the narrative below, there is an example term project available on the web site that nicely illustrates what should go into each section. Note that the economic analysis in the example project is formatted differently, but does basically the same thing.

I. Select 1) crop, 2) type of operation or market, and 3) size of farm. Provide a short justification for the crop you select, and choose/justify one of the following approaches:

- a. Roadside fruit stand or other form of direct market
- b. Pick-your-own (PYO) operation
- c. Wholesale/shipping market where fruit is sold by contract to brokers or retail food stores like Wal-Mart, Kroger, Whole Foods, etc.

There are advantages and disadvantages for each type of operation, and large differences in the amount of profit made for any given crop. Choices a and b are suited for smaller farms, and are often run by a single person or family, hiring seasonal labor when needed. Economies of scale preclude small farmers from most wholesale/shipping market operations, as larger farms are more cost efficient and can attract contract buyers with large volumes and lower prices. Prices paid to the grower (you) are highest for the roadside fruit stand approach, since you are not only the producer, but the retailer. In the pick-your-own approach, you are giving the buyer a price lower than average retail since they are providing some of the labor to produce the crop (they harvest it). Wholesale operations receive the lowest prices of any market, but arrange contracts so that the buyer guarantees purchase a set amount (hopefully, all that you can produce). Also, in wholesale production, you have no expenses related to advertising and retailing, whereas

you absorb these costs in the roadside or PYO markets.

One aspect to consider is the choice of organic versus conventional fruit production, regardless of the marketing approach. This decision should be made early, since many aspects of production differ between the two methods. We may need to modify your excel spreadsheet to accommodate all the changes involved with organics.

To determine the approximate size of your farm, you have to *work from the consumer backwards*. Look at the per capita consumption data for your crop (in the “contribution to diet” section of each chapter), and get an estimate of the population in your market. Then, calculate how many pounds of fruit you would sell to satisfy 100% of this market. Then, adjust down for the proportion of that total market that your farm will satisfy. Then, use crop yield data (in pounds/acre) to figure how many acres you need. Finally, divide your acreage as needed across different cultivars to give a relatively continuous supply of fruit over your marketing season.

For example, American consumers eat about 46 lbs of apples and apple products per year. If the population of your town is 100,000, that means 4.6 million pounds of apples are needed annually. Assume you capture 10% of that market; you would need to produce 460,000 lbs per year. Apples yield about 26,000 lbs/acre on average in the USA, so you would need 17 acres to produce the 460,000 lbs. If you go with 4 cultivars, then you need just about 4 acres devoted to each one.

II. Site selection

Next to choice of crop, this is the single most important decision you will make. Consult the newspaper, a realtor, or the web for land or existing farms available in the area you wish to locate your farm. Make note of the price (in \$/acre) and any other conditions of sale. It can be anywhere in the USA, but choosing a location you are familiar with will help when you are gathering information. Read the “site selection” document available on the web site, and use the criterion discussed therein for determining a suitable site. Assume you have the capital or could get a loan to start the business. Check the tax and insurance rates for the area with a realtor or a bank, as you will need to include this in your economic analysis.

III. Cultivar/rootstock selection

Cultivar selection is influenced by many factors, including consumer preference, adaptation to the soil and climate of your site, pollination requirements, disease resistance, and so forth. Also remember that in order to maximize your market season, you may need to choose several cultivars that ripen at different times. For example, a peach or plum cultivar will be harvested over about a 14-day period, so in order to market fruit for the entire summer, you would need 6 cultivars which ripen about 2 weeks apart. This spreads your labor over a longer time period, and decreases your risk as well, since if one or two cultivars fail, you have several others to market. Apples are an exception here

- you could get by with just 2 cultivars for cross pollination purposes, because apples can be stored for (and marketed over) several months without losing quality. Strawberries are another exception; since fruit can be harvested from the same plants for a period of 2 or more months, and strawberries are self-pollinating, PYO operations often use only one cultivar in an entire season. Consumers generally appreciate variety, so plan on having more than one cultivar on your farm unless you have unusually strong justification for not doing so.

The textbook and web site do not go into detail on cultivars. You need to consult extension literature from the state you are located in, and/or nursery catalogs that list characteristics such as ripening date, fruit color, size, etc. Use the “catalogs” link from my web site to go to on-line nursery catalogs. You can get the price for plants there also.

Once you’ve selected your cultivars, decide on the number of acres needed for each cultivar. In stone fruits (peach, plum, cherry, apricot), early cultivars generally produce less than mid- or late-season cultivars. Thus, 2 acres of an early cultivar produce as many bushels of fruit as perhaps 1 or ½ acre of a late season cultivar. However, prices paid to you are highest early, and drop to low values in July and August when there is a surplus of fruit on the market. PYO prices are generally constant through the harvest season, as repeat customers are the major part of the clientele. Dropping price mid-season would discourage early pickers, and raising price mid-season might jeopardize your repeat customer base - you may have to take a loss on the early stuff and recoup profit later.

For grafted species, select rootstocks appropriate for your region. The textbook (web site) has information on the major rootstocks, or I can point you to the right ones if needed. Again, consult the on-line nursery catalogs for prices of trees on various rootstocks - some cost more than others.

IV. Orchard layout

Provide a detailed description of the physical layout of the orchard including:

1. A scale drawing of the site, showing blocks of cultivars, row direction, equipment storage, office, parking lots, wells, ponds, etc. The example project shows a very nice farm drawing
2. Plant/tree density - by block if different among cultivars or sites
3. If used, an irrigation system design (see the example)
4. Other items like frost protection

***** see the example term project on this

V. Calendar of annual events

Provide an annual schedule of operations, including all cultural practices (see the example and do in tabular format by month)

***** see the example term project on this

VI. Economic analysis

You will use a Microsoft Excel spreadsheet program specific to your crop, complete with a list of instructions on how to use it to perform your analysis. You will fill in values in certain color-coded cells, and the program will calculate everything else you need. This will determine whether you made or lost money over the life of your farm! You may use it to run some “what if” analyses, then go back and make adjustments to cultural practices or equipment choices to fine-tune your approach.

If yield or any aspect of management changes between cultivars, blocks, or other subunits of your farm, then you need to run one analysis (spreadsheet) for each of these cases. Generally, there's one analysis per cultivar. Each one gives results in \$/acre of profit or loss, so you multiply your result by the number of acres to get total \$ made or lost.

Assume average yields and prices unless you can justify why higher/lower values would be appropriate. For example, research has shown that a perpendicular-V training system in peach increases yields by about 25%. If you choose this method, you'd put in higher amounts for tree costs (more trees per acre), more money spent on pruning, and of course the extra 25% yield the system generates. Remember, one simple change in management may affect a number of items in your budget.

Excel is available on virtually every computer at UGA, and on most computers at libraries and other public venues. Let me know immediately if you have a problem with the files.

You are encouraged to try new and innovative approaches to management, but *you must provide justification for using unconventional management methods*. Citing extension literature (web sites), research articles, or personal communications with actual farmers will suffice as “justification”.

This project requires one-on-one attention! Do not hesitate to ask me any questions at all. I am available by phone or e-mail to help you with this, and I'm expecting a number of contacts from each of you.