

PRODUCTION OF FRESH FRUITS AND VEGETABLES AS IT RELATES TO DIRECT MARKETING

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It is difficult to define all the personal and financial characteristics of any individual that lead to success. However, if any one attribute were to be identified, it would be management ability. Fruit and vegetable farmers must have the ability to juggle several activities at once. These include planting, cultural care, irrigation, pest control and harvest of several different crops at once while doing so in a timely manner. Managing labor and pleasing customers is another aspect that must be done as well as record keeping of finances and crop production. Growing produce crops requires daily observation of the crop and making decisions in a timely and appropriate manner. The other half of the job is selling your products for a profit so you can plant and produce next year.

Production of horticultural crops is a highly technical interplay of science, art, hard work and salesmanship. The science of production can be learned from many information sources but the art of production comes through experience. Hard work begins with planning during the winter months and continues through planting, cultivation, pest control, harvest and marketing. Production of a crop is only half the battle. The ability to sell the crop at prices that will return a profit requires as much skill and hard work as growing the product. The "glamour" of living on the land fades quite fast as a grower has a mature crop and no home for it. It must be remembered that perishable produce is consumed or spoiled in days to weeks after it is harvested.

Successful farming requires initiative, experience, favorable weather, imagination, management, timing, hard work and sometimes plain luck! Before getting started in large scale production ask yourself the following questions to the right:

Question	Answer
1. Do you grow a vegetable garden and keep it weed free?	A positive response does not guarantee success, but a negative answer indicates you may not be interested in the tiresome but critical aspect of growing vegetables - weed control.
2. Do you grow enough fruit and vegetables to can and freeze or would you rather buy produce in the off-season?	People who spend the additional time to can and freeze may be more self reliant and willing to work the extra hours required to be successful.
3. Do you keep records on personal income, monthly bills and expenses or detailed production records?	Precise and continuous record keeping is critical to success. Today's grower can't wait until tax time to find out if any money was made.
4. Do you have additional family members to work on the farm?	Net profits after labor costs may be small. Perhaps you're better off employing family members rather than hired labor. Evaluate your own situation.
5. Do you have adequate savings or off-farm income to cover cash expenses while growing fruits and vegetables?	Cash flow is critical on the farm as most expenses are incurred during the spring and payment may not be made for several months after harvest.
6. Can you afford a net income loss for the first 3 to 5 years?	Experience is expensive and it may take several years to learn to grow and market successfully.
7. Have you developed a 5 or 10 year long-range plan and goals that are written down?	Have a carefully planned goal. It helps get you through the tough times.
8. Do you consider farming a lifestyle or a business?	It better be both if you expect to be successful.

Production Planning

One of the most commonly asked questions is “What should I grow?” The answer is quite simple, “Grow what you can sell for a profit.” Generally marketing will direct production. However, determining what and how much of each crop that should sell is difficult.

Two distinct and inclusive categories of markets are available for the sale of vegetables and fruits. These are: 1) fresh produce markets, which usually provide higher returns per unit but require high and consistent quality. Large markets such as grocery and restaurant chains require large quantities which small growers can not usually satisfy; and 2) processors, who provide a steadier market which is less subject to daily price changes which are caused by over or under production. They can also handle large quantities of product and usually have contracts with growers to harvest at certain time intervals to keep their processing facilities operating over a long period of time.

If you want to sell to chain stores and restaurants, you may need to pool your products with other growers and sell through a shipper/broker. In that case your returns will only be about 15 to 25 percent of what retail prices are.

Most new growers of produce are usually better off trying some type of test marketing of direct marketing on a small scale before committing to a specific strategy. Options include, but not limited to, pick-your-own (PYO), roadside stands farmers markets or mail order marketing. However, there are barriers to market entry. For example if a farmers market does not exist it can be very difficult getting one established. Or if your location is poor perhaps a roadside stand may not have the traffic volume to support it. Risk assessment must be done on any new marketing strategy. (See the article on “Assessing Risks and Finance Requirements” in the Market Analysis and Pricing Section).

New growers are encouraged to visit existing operations and talk to the owners. Also speak with local restaurant and grocery store owners. Generally they would prefer to buy high quality, homegrown products. A potential buyer wants not only to know you have a desire to supply quality products, but that you have the ability to produce a quality product in sufficient quantity. The first few years are critical as you seek to gain a reputation as a reliable producer of quality products.

Established markets may take rather large quantities of produce if demand is high. You plan for this. Some vegetables, such as sweet corn, tomatoes, snap beans and melons are usually pre-picked for sale at PYO operations. The reason is that the general public can not judge crop maturity by appearance or feel. Succession plant is imperative to meet the market demands through the growing season. Other crops that can be sold as pre-pick or PYO products. These include bell and chili peppers, eggplant, carrots, potatoes, beets, turnips, cucumbers, cabbage, broccoli, parsley, pumpkins and various summer and winter squashes. If you have in your marketing area people from different regions of the country or ethnic groups, grow products that they enjoyed in their native areas. For examples people from the southern United States enjoy okra, black-eyed peas, collards, turnip and mustard greens. People from Asia enjoy bok-choy, dikon radish, and various greens. However, these can have limited appeal, so beware of over production for local markets.

Production of fruits can be very rewarding. Tree fruits and nuts like apples, pears, peaches, apricots, cherries, plums, citrus, pistachios, pecans and walnuts require a commitment for 20 to 30 years or longer. Spring frost problems can decrease production or wipe it out for the entire year. However, the trees still will need capital investment and labor to keep them growing for next year’s crop. Labor for harvest can be great and pick-your-own marketing will reduce harvest costs,

however, many orchards that have plantings of 20 to 30 acres generally sell only 10 to 20% of their crop to PYO customers. The large majority are sold already picked in bags and boxes to commercial customers. This necessitates a packing line which is a major capital investment. Small fruits like grapes, strawberries, raspberries, blackberries, currants and gooseberries will produce marketable crops in the 3rd or 4th year. Production can last from four to eight years in the case of strawberries and brambles and many, many years for other small fruits. For example some grapes will be productive for 50 to 75 years. Small fruits are labor intensive when it comes to harvest and lend themselves well to pick-your-own operations. These fruit plants are shorter lived than tree fruits and therefore more easily changed over to other crops.

In addition to markets, the decision on what to grow will be determined by how much labor, land, equipment and capital you have available. Many vegetables present potentially high returns but also require high capital investment. Generally, the higher the return on a crop the higher the risk. For example sweet corn is relatively easy to produce and market locally, however, the return will be much less that for bell peppers or broccoli, which are more difficult to grow and sell. Also low labor requiring crops might be preferred unless family members are available to work. Sweet corn requires less labor than crops like tomatoes or cucumbers which are picked throughout the season and lend themselves to PYO operations.

Markets not only influence what and how much you choose to grow, but also how it is grown. For example, a pick-your-own market might dictate that a grower produce pole tomatoes or pole beans that can be over the season rather than bush type varieties which will produce for a short period of time and then be tilled under and replanted. Early producing varieties will capture the early market which is usually more lucrative.

Once the appropriate marketing plan and list of potential crops have been developed, the production potential of these crops in the producer's operation should be determined. Although yields vary greatly by location, "good yield" estimates for tree fruits, nuts, small fruits, and vegetables are given at the end of this article. Producers should consider four areas when evaluating the production potential for fruit and vegetable crops. These are: production resources, cost assessment, risk assessment and operation evaluation.

Production Resources. Important production resources to consider are land, water, labor, capital, management and machinery. There is a great variance in soil types and weather patterns even in a relatively small area and must be considered when selecting fruit or vegetable crops for production. When evaluating land and water resources, producers need to consider soil types, topography, wind control, previous cropping history of the site, irrigation system and length of growing season.

The soil type will influence the crop selection process. Some crops can be grown in a wide variety of soils while others need specific soil types. Topography affects the length of the growing season and air and water drainage, light intensity and field erosion. Wind can severely damage fruit and vegetable crops, especially crop stand and quality. Previous crop production can be critical to the success of a fruit or vegetable enterprise. A previous crop on the same field can influence the type of pests and weed problems that the crop will experience. Also, it is important to know the history of the field regarding what pesticides and herbicides have been used on the site and what if any carryover of chemical residues exists.

In order to produce most fruit and vegetable crops an irrigation system is needed. Producers can use ground or surface water with various irrigation technologies, (flood, furrow, sprinkler,

drip) depending on soil types, topography, labor and available capital. Also, irrigation districts plus local, county and state laws may dictate when, how and where you irrigate.

In some cases the short growing season of many vegetable crops allows producers to double and even triple crop plots of land. Several advantages of multi-cropping are that low prices or crop failure may not result in a total loss for the season. It may be possible to keep labor employed for longer periods, thus increasing the chances of having labor when needed. Some crop rotations may decrease the chance of pest buildup and lessen fertility loss. Low pre-harvest capital requirement crops may be used to provide cash for high preharvest capital requirement crops. The ability to sell more than one product produces more traffic, generates repeat consumers, and allows marketing over a longer season. Some disadvantages of multi-cropping are: more management skill and knowledge about each crop's culture is required; labor and harvest scheduling may become more challenging if planting and harvest overlap for different crops; the days to harvest will decrease or increase as temperatures increase or decrease for the same crop; the number of pest problems may increase; and field and harvesting equipment needs may conflict and require more capital investment for the purchase of more equipment. Many of the before mentioned advantages and disadvantages also exist for normal diversification among fruit and vegetable producers growing crops simultaneously on different pieces of land.

Size of operation and crops produced dictate the amount of labor required. Producers should consider when, how much and what type of labor is needed. The timing of labor requirements depends on the crop and its growth pattern. Some crops are more labor intensive during the growing season, while others require more labor at harvest. Labor can come from various sources - family members, area

students, local people, unemployment offices, migrant labor or in the case of PYO farms harvest labor from your customers. No matter what the labor source producers need to check the laws and regulations regarding hired labor.

Since some tasks will be regarded as difficult by laborers and labor might not be available, producers should consider using machine energy instead of human energy if possible and financially feasible. Machinery can increase the investment costs but decrease the operating costs of the operation. Some examples of harvest equipment are bean pickers and sweet corn pickers.

In starting most enterprises capital is an important consideration. The amount of capital required, rate of interest, opportunity costs and availability are all very important areas of consideration. Capital resources of other current enterprises should be considered as well as off-farm income and/or some type of commercial financing. Costs of capital are affected by attitudes of lenders toward new enterprises, the amount of risk involved and interest rates.

Producers should consider crop capital requirements and their own capital constraints carefully when selecting fruit and vegetable crops. Establishment of most fruit and vegetables requires large amounts of capital. For example, fruit trees, small fruits and asparagus require significant start-up capital with little or no income for three to five years. Tomatoes require large amounts of labor if they are staked and tied.

Management is an essential part of fruit and vegetable operations. Producers need to consider their management skills when starting any new enterprise. Evaluations should be made of how much experience they have growing fruits and vegetables and other crops that have similar cultural requirements. Also, they should consider if assistance is available to them when problems arise and if they

are willing to seek that assistance when needed.

Commercial fruit and vegetable production requires different growing practices and skills than home gardening. Most horticultural crops require daily observation by the manager in order to control pests and manage other potential problems. The saying, "If you can see the weeds from your truck in a field it is past time to control them," is true. It is much easier to control small weed seedlings than large mature weed plants. Producers with little experience who are not willing to seek and use outside information resources substantially reduce the likelihood of being successful with fruit and vegetable enterprises.

Producers need to evaluate the machinery they own and determine if it is suitable for fruit and vegetable production. Can the machinery currently owned be converted for the new enterprise? How expensive is new or used machinery and is it available? Are custom operators available for hire at affordable rates for special operations? Generally fruit and vegetable operations do not require large tractors and implements for cultivation and other cultural practices.

Cost Assessment. Before a new crop or crop mix is placed into production, producers should estimate as completely as possible all costs associated with such production. Direct costs of operation can be estimated based on input requirements and costs. Some new crops require the purchase of costly new equipment or irrigation systems and the location of new sources of labor and other inputs. Equipment costs should be amortized. Special costs should be accounted for that are associated with different sources of input. Also, the amount of income normally received for other uses from the acreage allotted to the new crop should be in the cost estimates. For instance, if the fruit/vegetable production site is currently

used for wheat production, producers should also consider the amount of net income that could have been generated from wheat.

Producers should consider labor and irrigation requirements and their associated costs very closely. Depending on operation size, labor may be a very significant expense. Some crops will require a great deal more labor at planting and harvest than at other times during the production process.

Comparative cost estimates can be useful to evaluate irrigation systems, labor, equipment and other production inputs. Producers can create different input cost scenarios for their various options and select the most efficient. Cooperative Extension can provide useful information to perform cost analyses using crop budgets. (See the article that follows on Estimating Costs of Production.) This information is available for most vegetable and field crops that grow in your county. Contact your local Cooperative Extension Office to obtain this information.

Risk Assessment. After market and farm management decisions have been made, producers should look at the risk involved with each of the enterprises considered. Risk is said to exist when the outcome of an activity is not certain. From the probabilities or estimated probabilities of potential outcomes for an activity, the level of risk associated with that activity can be estimated. Fruit and vegetable producers should be concerned with the probability of disastrously low or negative returns. A small probability of a loss, sufficient to financially destroy a producer, may be "too big a gamble to take". Each producer should evaluate such "gambles" in light of his/her own financial strength and willingness to take risk. (Refer to the article on "Assessing Risks and Finance Requirements" in the Market Analysis and Pricing Section).

Operation Evaluation. After each year of production, it is important for producers

to evaluate their operation. Record keeping done throughout the production period is very useful in the evaluation process. Records should be financial and operational in nature. Financial records should include start-up expense, capital equipment list, cash flow statements, balance sheets and income statements. Operation records should include day-to-day operations and production practices such as when, where and what varieties were planted, fertilizer inputs, pesticides and herbicides used and rates, date and method of spraying, irrigation times and amounts, harvest dates and labor requirements. Also during the year write down notes of ideas that come or ways to improve production. You will not remember many thoughts you had yesterday if they were not written down. These records help producers locate problems or potential weakness that should be addressed and where inputs should be increased or decreased. Tracking specific products for a week or randomly during the marketing season will provide a snapshot of the value of specific products in your marketing program. The evaluation process also helps growers isolate areas of production and management where they need to learn more. Continuous learning and a sound record keeping system are critical to the success of fruit and vegetable operations.

Special Considerations. Fruit and vegetable production is very different from the extensive type of agronomic crops that are grown on large acreage. One acre of vegetables is equivalent to several acres of agronomic crops in terms of capital inputs and management. For example the management time and capital inputs needed to grow and market one acre of quality sweet corn is roughly equivalent to 50 acres of field corn because of insect pressure and harvest costs. Or the harvest of one acre of zucchini through the growing season is equivalent to 100 acres of cotton or wheat because the acre of summer squash must be harvested several times a week for several months.

Producers' Expectations. Farmers should realize that fruit and vegetable crops are not the salvation they are seeking if they are in financial distress. If producers have extreme debt problems and have overextended their credit, fruit and vegetable crops will not clear their debts away. Fruit and vegetable crops can help increase producers' incomes but only with a very high level of management and a fairly high degree of risk. Some studies by universities and experiment stations show potentially high returns per acre. It should be remembered that such information is based on small, intensively managed plots which at times are smaller in scale than a good sized family garden.

Planning. Producer's should make detailed plans of new enterprises well before planting. Market alternatives should be identified and evaluated; field layout and production resources should be planned. All potential crop options should be evaluated in light of particular objectives and resource limitations (land, labor, capital and management).

Knowledge. Producers should objectively evaluate their own abilities, constraints and knowledge relative to growing fruits and vegetables. If they need management assistance and/or information the availability and accessibility of such sources should be considered. The growers willingness to seek out information and assistance should be evaluated. Many books and magazines are available on topics necessary to produce and market quality products. Seminars, conferences, short courses and grower organizations are great places to gather information. Both from presentations and others who are involved in the same business.

Self education and knowledge can be gained by doing small experimental plantings of promising varieties or potential cultural practices. This will enable the grower to see if they are as good in the field as the normal varieties or cultural practices with out the cost in

terms of time and money of a large planting. Cooperative Extension, Experiment Station, Land Grant University and industry personnel can assist growers with on-farm trials.

Much of this article was adapted from: "Should I Grow Fruits and Vegetable? Identifying and evaluating the Possibilities." by Rennee M. Lloyd et. al. Oklahoma State University Cooperative Extension Facts Sheet No. 180.

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Yields of Tree Fruits, Nuts and Small Fruits

Tree Fruit	Good Average Yield/A	Yield/Tree	Sales Unit
Apples, semidwarf	660 bushels	4 bushels	bushel (42 pounds)
Cherries *	30,000 pounds	120-200 pounds	lugs (20 pound)
Peaches, nectarines *	250 bushels	2-3 bushels	1/2 bushel (25 pounds)
Pears	400 bushels	2-3 bushels	bushel (50 pounds)
Plums *	200 bushels	2 bushels	1/2 bushel (pounds)
Citrus	Good Yield (60 lb. Field Box)	Yield/Tree (60 lb. Field Box)	Sales Unit
Grapefruit	1000	10	Field box (60 pounds)
Kumquats	300	1.5	Field box (60 pounds)
Lemons	800	8	Field box (60 pounds)
Limes	500	5	Field box (60 pounds)
Mineolas	340	5	Field box (60 pounds)
Oranges			
AZ. Sweet	650	6.5	Field box (60 pounds)
Blood	650	6.5	Field box (60 pounds)
Navel	250	2.5	Field box (60 pounds)
Valencia	650	6.5	Field box (60 pounds)
Tangerines (Mandarins)	600	6	Field box (60 pounds)
Nuts	Good Yield/pounds/A	Pounds/Tree	Sales Unit
Almonds	1,800 in shell	25	pound
Pecans	2,000 in shell (1,000 kernal)	50 (25)	pound
Pistachios	2,000	17-20	pound
Walnuts	4,000 in shell (1,600 kernal)	100	pound
Small fruit	Good average yield/Acre	High Yields	Sales Unit
Blackberries: Thorned	4,000 pounds	6,000 pounds	gallon (6 pounds) or pound
Thornless	6,000 pounds	9,000 pounds	gallon (6 pounds) or pound
Blueberries (need pH 4.5-5.5)	5,000 pounds	7,000 pounds	pound
Grapes	8,000 pounds	10,000 pounds	bushel (44 pounds) or pounds
Red raspberries	4,000 pounds	6,000 pounds	pints (12 pints=11-15 pounds)
Strawberries	7,000 pounds	10,000 pounds	quart (1.5 pounds) or pound

*(Spring Frost Damage Possible)

YIELDS OF VEGETABLE CROPS

Vegetable	Average ¹ Yield in the United States (cwt/acre)	Good Yield ¹ (cwt/acre)	Average/100 ft. ² of row (pounds)	Sales Unit ³
Artichoke	75	100	30	Crate (25 pounds) or each
Asparagus	25	40	30	Crate (32 pounds) or pound
Bean, bush	40	100	120	Bushel (28 pounds)
Bean, pole	55	100	150	Bushel (28 pounds)
Bean, Lima	30	40	25-50 shelled	Bushel (32 pounds)
Beets	140	200	150	Crate, bunched doz. (45 pounds)
Broccoli	85	110	100	Bunch (14-18)) or head (1.5 pounds)
Brussels sprouts	125	160	75	Carton (25 pounds)
Cabbage, market	250	300	150	Carton or bag (50 pounds)
Cantaloupe (muskmelon)	140	200	100 fruit	Crate (40 lbs.)
Carrot, topped	280	350	100	Sacks (50 pounds)
Cauliflower	100	150	100	Head (1 pound) Carton (25 pounds)
Celeriac	-	200	60	Bushel (50 pounds)
Celery	500	700	180 stalks	(Crate 60 pounds)
Chard, Swiss	-	150	75	Bushel (20 pounds)
Corn, market	80	120	10 dozen	Dozen or crate (40-60 pounds)
Cucumbers, market	110	250	120	Bushel (48 pounds)
Eggplant	200	250	100	Bushel (33 pounds)
Endive, escarole	140	180	100	Bushel (25-35 pounds)
Garlic	130	160	40	Cases (5, 10, 30) pound
Horseradish	-	80	20	Bushel (50 pounds)
Lettuce	230	350	50	Carton (20,30,50 pounds)
Melon, Persian	120	150	75 fruit	5 lbs each (carton 30 lbs)
Melon, Honeydew	180	250	125 fruit	5 lbs each (carton 30 lbs)
Okra	-	100	100	Bushel (18 or 30 pounds)
Onion	310	400	100	Bag or bushel (50 pounds)
Pea, climbing	40	60	40	Box (10 pounds) Bushel (28 pounds)
Pea, bush	28	40	20	Box (10 pounds) Bushel (28 pounds)
Pepper, bell	110	200	60	Bushel (25 pounds)
Pepper, chili (dried)	40	60	8	1/2 Bushel (15 pounds) Crates (10 pounds)
Pepper, Pimento	40	60	8	Bushel (30 pounds)
Potato (Irish)	250	350	100	Bags (5, 10, 15, 20, 50 pounds)
Pumpkin	-	400	100	Each (10-20 pounds) 1,000 pound bulk bins
Radish	-	-	100 bunches	Bushel (30 pounds) or 4 dozen bunch
Rhubarb	-	50	25	
Rutabaga	-	400	100	Bushel or bag (25 or 50 pounds)
Spinach, market	70	150	40 50	Bushel (20 pounds)
Squash, summer	-	300	150	Lugs (20 or 28 pounds)
Squash, winter	-	400	100	Each (5-20 pounds) 1,000 pound bulk bins
Sweet potato	115	200	100	Bushel (50 pounds)
Tomato, market	170	200	100	Bushel (50 pounds) or carton (10-20 pounds)
Turnip (roots or greens)	-	300	50 100	Bushel (50 pounds)
Watermelon	115	200	40 fruits	Each (15 to 25 pounds) 1,000 pound bulk bin

¹ **Knott's Handbook for Vegetable Growers.** Oscar A. Lorenz and Donald N. Maynard, 1980. John Wiley and Sons, Inc., New York. pp. 299-300.

² **Growing Your Own Vegetables.** 1977. USDA Agriculture Bulletin 409, p. 109.

³ **Net Weights and Processed Yields of Fruits and Vegetables in Common Retail Units.** C.M. Sabota and J.W. Courter, 1986. Horticulture Marketing Fact Sheet #3. University of Illinois Cooperative Extension Service.

³ The Packer 1993. **Produce Availability and Merchandising Guide.** Volume 100, No. 53, Overland Park., Kansas.

