Field-grown Tomatoes
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Introduction
Tomato (Lycopersicon esculentum) is a warm-season crop that originated in South America. Tomatoes are one of the most popular and profitable crop alternatives in Kentucky. Growers able to provide the earliest locally grown tomatoes can often demand a premium price.

Marketing
Tomatoes are grown in Kentucky primarily for fresh market sales. There is a significant processing tomato industry in neighboring states (Indiana), but there has been little development of large-scale processing of vegetables in Kentucky. Demand for locally produced tomato-based products, like salsas and sauces, has resulted in a small regional processing market in some parts of the state.

Fresh market options include roadside stands, local wholesalers and retailers, national wholesale markets, community supported agriculture (CSA) subscriptions, cooperatives, produce auctions, local restaurants, and farmers markets. Planting for very early or for late fall markets often brings the most profit since prices tend to be higher. New producers should consider low-volume retail sales opportunities, such as farmers markets or roadside stands. Large-scale production usually requires knowledge of wholesale marketing channels that can handle larger volumes of produce.

Market Outlook
Fresh tomatoes are very popular with consumers, and tomatoes form the foundation of many fresh vegetable marketing programs across all market channels. U.S. per capita consumption of fresh tomatoes increased during the 2000s, while per capita consumption of processed tomatoes declined. The “snacking” tomato category – cherry, grape and some Roma types – has increased in popularity. Growth potential continues for most fresh tomato market outlets.

Production Considerations
Variety selection
Cultivar selection is a critical decision for commercial tomato growers, but with thousands of varieties available it can seem a daunting task. Cultivars differ in such horticultural traits as fruit characteristics (e.g. size, color, shape, flavor, and intended use),

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Earliness (early, mid, and late season), growth habit (determinate and indeterminate), and disease resistance. Consideration needs to be given to regional preferences, as well as whether to grow hybrids and/or heirloom cultivars. Growers should select only adapted varieties that have the qualities in demand for the intended market.

Site selection and planting
Choose a site with well-drained soil that warms up quickly in the spring. Tomatoes are quite cold-sensitive, so avoid low-lying fields that are subject to late frosts and high humidity. Locate tomato fields where plants will not be damaged by herbicide carryover or drift. In addition, fields should be rotated out of tomatoes and related solanaceous crops (e.g. tobacco, pepper, and potatoes) for a period of three years. Tomatoes do well when transplanted to a field where fescue sod was plowed under the previous fall.

Stocky, container-grown transplants are most desirable for transplanting as they will result in higher early yields than bare-root plants. Early tomatoes generally command higher prices, which usually more than offsets the higher cost of good quality container-grown plants. Many growers produce transplants in 72- or 128-cell trays, although some grow transplants for their earliest crops in larger cells. Tomatoes will tend to get “leggy” if produced in smaller cell trays where plants are tightly spaced. Transplanting is done during the latter part of April or early May for a spring crop and in mid-July for a fall crop. Most growers use approximately 4,200 to 5,000 plants per acre.

Tomato plants are pruned, staked, and trellised to obtain higher and earlier yields. Trellising not only improves fruit quality, but allows for quicker harvests and better spray penetration for pest management. University of Kentucky on-farm demonstrations have shown that the highest profits can be obtained with raised beds covered with black plastic and using drip irrigation and fertigation. The moisture levels under the plastic must be carefully monitored when using this plasticulture system so that they are relatively constant during the growing season. Allowing soils to dry then rapidly applying large volumes of water can lead to cracking in the fruit. Alternating wet and dry soils can also impact root growth, which in turn leads to problems with calcium absorption and the development of blossom end rot.

Pest management
Tomatoes are subject to a large number of diseases, which include anthracnose, bacterial canker, bacterial spot, early blight, Fusarium wilt, root knot nematode, Septoria leaf spot, southern blight, and Verticillium wilt. Resistant varieties are available for several diseases; nevertheless, the control of foliar and stem diseases will require regular sprays of both bactericides and fungicides for most of the season. Timing of sprays, good coverage, weed management, and sanitation are critical to disease control. Blossom end rot is a common physiological disorder related to poor calcium uptake. It usually results from sporadic irrigation and insufficient calcium movement into the fruit via the plant’s transpiration stream. This disorder can largely be prevented with careful water management.

Potential insect pests include aphids, cutworms, flea beetles, fruitworms, mites, and stinkbugs. Scouting to monitor populations can help the grower determine when and how often insecticides should be applied. Herbicides, plastic mulch, and a good rotation system can help manage weeds.

Harvest
Tomato fruit is easily damaged and should be handled as carefully as possible in all picking, grading, packing, and hauling operations. Fruit is harvested at the maturity stage preferred by the intended market. Vine-ripe tomatoes must be harvested as often as twice a week, whereas mature-green tomatoes are only harvested three or four times during the season. Pack tomatoes in the type and size container the market requires.
Typically the stem is removed to prevent damage to other tomatoes in the box.

**Labor requirements**

Labor needs per acre are approximately 60 hours for production, 600 hours for harvest, and 100 hours for grading and packing. Plasticulture will add 10 to 18 hours more per acre, mainly for the removal and disposal of the plastic.

**Economic Considerations**

Initial investments include land preparation, the purchase of seed or transplants, and the purchase of stakes or other training system. Additional start-up costs can include the installation of an irrigation system and black plastic mulch.

Production costs for staked, trickle irrigated tomatoes are estimated at $2,130 per acre, with harvest and marketing costs for 1,600 boxes at $8,150 per acre. Total expenses are approximately $10,900 per acre.

Tomato returns vary depending on actual costs, and returns are very sensitive to different yields and market prices. The following estimated returns to land and management per acre are based on three different scenarios. These represent estimated returns above a $3,300 cost for operator labor (220 hours at $15 per hour). Conservative estimates represent an estimated return for 2014.

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<th>Scenario</th>
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<th>Conservative</th>
<th>Optimistic</th>
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<td>$520</td>
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**Selected Resources**

- Vegetable and Melon Budgets (University of Kentucky, 2013) [http://www.uky.edu/Ag/CCD/vegbudgets13.html](http://www.uky.edu/Ag/CCD/vegbudgets13.html)
- Vegetable Production Guide for Commercial Growers ID-36 (University of Kentucky) [http://www.ca.uky.edu/age/pubs/id/id36/id36.htm](http://www.ca.uky.edu/age/pubs/id/id36/id36.htm)

For additional information, contact your local County Extension agent.