

Organic Crop Production

Introduction

The term “organic farming” first came into use in the U.S. in the 1940s; however, organic crop production did not begin to really develop as an industry until the 1970s. In the early decades of the organics movement, a lack of uniform standards meant that organic agriculture ran the gamut from “farming by neglect” to the minimal use of synthetic chemicals. This changed with the passage of the Organic Foods Production Act in 1990 and the implementation of mandatory certification requirements in 2002. The adoption of a uniform standard has benefited both organic growers and consumers. Today organic crop production is one of the fastest growing segments of agriculture.

This profile presents a general overview of organic production methods and economics. It is one in a series of introductory information sheets concerning organic crop production in Kentucky. For a more complete discussion of allowable and excluded agricultural practices, refer to the National Organic Program (NOP) regulations.

Marketing

Identifying markets for organic produce generally requires more time and effort than locating markets for conventionally produced crops. Fresh market options include roadside stands, farmers markets, local grocery stores, produce wholesalers, and produce auctions. Restaurants and health food stores may also be interested in locally produced organic products.



Market Outlook

USDA statistics report an increase in Kentucky certified organic acreage from 2002 to 2003. This increase reflects the rapid, almost explosive, nationwide increase in consumer demand for organic products. U.S. sales of organic products have grown 20% or more each year for the past decade. Fresh produce constitutes the largest sector of the organic industry and accounts for a significant share of the organic market growth. Consumers purchase organic products for various reasons, including flavor, perceived health benefits and environmental concerns. These consumers come from a wide variety of income levels, educational experiences and ethnic backgrounds. USDA economists and industry trade groups expect the current rate of growth in the U.S. organic industry to continue.

Production Considerations

Certification requirement

All producers labeling or selling their products as “100% organic,” “certified organic” or “organic” must comply with NOP regulations.



In addition, growers with an annual gross income of more than \$5,000 from organic sales must be certified by a USDA-approved state or private certifying agency. The Kentucky Department of Agriculture (KDA) handles the certification process for Kentucky residents. Small growers (less than \$5,000 per year gross income) may be exempt from certification; however, they must register with the KDA even if they choose not to become certified.

Organic system plan and record keeping

Organic growers are required to develop and follow an Organic System Plan (OSP). The OSP must contain details on current production, harvesting and storage methods, including all materials (inputs) that will be used. The initial OSP is submitted with the certification application, but it must be updated and approved annually. Growers wishing to make changes to their OSP during the growing season must first receive written approval from the certifying agency. The certifying agency also conducts annual on-site inspections to make sure the farm is in compliance with NOP standards.

Record-keeping is an essential aspect of organic production, and documents must be maintained for a minimum of 5 years. The NOP requires that records fully disclose every activity and transaction conducted in the operation of the organic farm. This includes accurate maps with the complete histories of all fields, greenhouses and plant beds used in organic production; farm-related correspondence; labels and receipts for purchases; production, harvest and storage logs; and any soil/water test results.

Transitioning to organic production

Only land that has been free of prohibited substances (e.g. synthetic pesticides and artificial fertilizers) for 3 years can be certified for organic production. The actual conversion from conventional agriculture to full organic production, however, can take from 3 to 5 years, depending on the crop(s), soil fertility, and the transitioning approach. A well-designed organic

system will require progressively fewer and fewer off-farm inputs each year. Agricultural practices outlined in the grower's OSP are employed during the transition period; however, produce may not be marketed as organic until after all certification requirements have been met.

Site selection and planting

Selecting a site that is well-suited to the crop being produced is especially important in organic production. Healthy, fast growing plants can better tolerate or outgrow pest problems. Choosing appropriate varieties, plant densities, and planting dates are also critical to enhancing plant health.

All seeds and other planting stock (rhizomes, shoots, cuttings, tubers and transplants) must be certified organic and either purchased from a reputable dealer or produced organically on the farm. Seed used for cover crops must also be certified organic. Furthermore, planting materials cannot be treated with any prohibited substances. Planting stock for perennial crops, such as fruit trees, can be purchased from conventional sources. However, after these crops are transplanted, they must be grown organically for 12 months before the produce can be sold as organic. The use of genetically modified varieties (GMO) is prohibited.

Production methods

The emphasis of organic production is on biodiversity and the use of natural means of plant fertilization, soil building and pest management. The National Organic Standards Board has defined organic production as "an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony."¹

Many of the traditionally sound cultural practices recommended for conventional agriculture are also employed in organic production. In fact, organic agriculture has been referred to as

“good farming practice without using synthetic chemicals”.² For example, planned crop rotations, which have multiple benefits in terms of soil building, plant health, pest management, and enhancing biodiversity, are required in annual organic cropping systems. Perennial cropping systems rely on alternative methods, such as intercropping, alley cropping and hedgerows, to gain some of these benefits.

Planting cover crops, cultivating, composting, irrigating and using animal and green manures are also employed in organic systems. Mulching materials can include natural materials (e.g. wood chips) or allowable synthetic materials (e.g. newspaper). Plastic mulch is permitted in organic production if it is removed at the end of the harvest season.

Healthy soil is the key to successful organic production. Depending on the condition of the soil, it can take several years to build up organic matter and improve soil quality. Soil fertility is enhanced through cover crops, nitrogen fixing legumes, green manure, animal manure, and approved natural fertilizers. There are no restrictions regarding the source of manure; however, the NOP does regulate the application of raw manure. In addition, compost and composted manure must meet specific processing requirements. The use of raw or composted sewage sludge is prohibited because of the presence of heavy metals.

Organic crops must be protected from potential contamination by adjoining conventional farms, as well as from non-organic fields in split operations (organic and conventional production on the same farm). The drift and run-off of prohibited substances, as well as the pollen drift from GMO varieties, can compromise the farm’s organic certification status. The certifying agency can require water, soil and plant testing in cases where contamination is suspected. Preventative strategies include the use of buffer zones and barriers, altering drainage patterns, posting “no spray” signs, and cooperating with neighboring

conventional farmers. Growers with split operations must take additional steps to prevent the commingling of their two systems during all stages of production, harvest, storage and transportation. For example, shared equipment and storage facilities must be decontaminated before use with organic crops.

It is important to note that not all non-synthetic materials (natural) are allowable, nor are all synthetic materials excluded from use in organic production. Notable exceptions include insecticidal soap, a synthetic compound that can be used in pest control and tobacco dust, a natural product that is not permitted. The Organic Materials Review Institute (OMRI) evaluates materials for use in organic agriculture and publishes their findings in the form of lists of allowable and prohibited inputs. The certifying agency, however, makes the final decision regarding what products can or cannot be used on the organic farm.

Pest management

Managing insect pests, plant diseases and weeds may be the greatest challenge in organic farming. Pest management in organic fields emphasizes prevention through good production and cultural methods. The goal is not necessarily the complete elimination of a pest, but rather to manage pests and diseases to keep crop damage within acceptable economic levels.

Some strategies include: using crop rotations that disrupt the pest life cycle, improving soil quality, practicing good sanitation, using optimum planting densities, timing planting and transplanting operations to avoid high pest populations, employing biological control, and growing resistant varieties. Approved pesticides that have been listed in the grower’s OSP can be used in organic production, but they should be viewed only as a last resort. Monitoring pests through frequent crop inspections and accurate identification are essential to keeping ahead of potential problems.

Harvest and storage

Products grown organically during the transition period can not be marketed as organic. Only those crops that have met NOP production and certification standards, including the 3-year minimum transition period, can be marketed and sold as certified organic or organic.

Many growers have found that yields can decline during the conversion to organic production; however, yields often improve following this transition period. Yields for crops in full organic production may be 90 to 95% of conventional yields, depending on the cropping system.

Harvest equipment, storage areas and packaging materials must comply with NOP standards. Growers with split operations must either use separate equipment and facilities for these operations or decontamination protocol must be followed before use in the organic end of the enterprise. Packaging materials must be protected against potential contamination from prohibited substances.

Labor requirements

Organic systems are more labor intensive than conventional systems. This higher labor requirement is most often attributed to the increased time monitoring and managing pests. Washington State research statistics indicate that labor hours per acre can be as much as 11% higher for agronomic crops. The increase can be much greater for horticultural crops.

Economic Considerations

Organic crops can receive price premiums of anywhere from 10 to 200% or more over conventionally grown products, according to the USDA Economic Research Service. These higher prices can translate to higher profits for organic growers.

Organic price premiums may partially result from an increasing demand for organic products, coupled with a limited supply. In addition, some

organic crops can be more expensive to grow, to market and to transport than their conventional counterparts, thus resulting in higher prices. More intensive labor requirements, the higher cost of organic planting material, the purchase of specialized equipment and the cost of organic inputs are some of the reasons for greater production costs. Further expenses can be incurred when organic products must be segregated from conventional products during transportation, processing and storage.

Conversely, some organic commodity crops have lower costs of production than the same conventional crops. A recent study of corn and soybean production in Iowa found that organic farms had lower fertilizer and pesticide costs, but higher seed and machinery costs. On the average, the total cost of organic production was slightly lower than that of conventional production. A SARE-funded study of organic potatoes in Idaho found no overall difference in fixed and variable costs when compared to traditional production.

A number of studies comparing organic and conventional cropping systems have found that yields of crops in full organic production may be somewhat lower than that of conventional production. Most often cited are yield reductions of approximately 5 to 10%; however, in some studies these reductions were higher. At least one research study has indicated that organic crop yields were much higher than conventional during drought years. Yields can vary depending on the crop, variety, weather conditions, production methods and grower expertise. Even with somewhat lower yields, higher price premiums can make economic returns for organic production equal to or higher than conventional production.

Organic production, however, does not necessarily guarantee higher wholesale or retail prices. A 2004 Organic Research Foundation survey of organic farmers found that only 41% of the respondents received a price premium for all of their organic products. Another 86%

reported receiving a price premium on some portion of their organically grown products. Price competition with conventional products and limited local demand (e.g. in rural areas) are some of the reasons mentioned for failure to receive price premiums.

In summary, organic crops are in increasing demand and often receive price premiums. While the learning curve to grow crops organically and the 3-year transition period are challenging, there should be market opportunities for Kentucky growers in both direct and wholesale markets. For an excellent description of the market for organic produce and the current price premiums received, see “Price Premiums Hold on as U.S. Organic Produce Market Expands”.

¹ Definition passed by the National Organic Standards Board, April 1995 meeting.

² “Organic Crop Production Overview” by George Kuepper and Lance Gegner, ATTRA, August 2004.

³ “Fourth National Organic Farmers’ Survey” by the Organic Farming Research Foundation, 2004.
<http://ofrf.org/publications/survey.html>

More Information

Electronic publications

- Vegetable Production Guide for Commercial Growers - Appendix G: Organic Manures and Fertilizers, ID-36 (University of Kentucky)
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>
- Agricultural Alternatives: Organic Vegetable Production (Pennsylvania State University, 2000)
<http://agalternatives.psu.edu/crops/OrganicVegetables/OrganicVegetableProduction.pdf>
- Enterprise Budgets and Production Costs for Organic Production: Business and Marketing Resource List (ATTRA, 2004)
<http://www.attra.org/attra-pub/enterprisebudgets.html>

- Organic Crop Production Overview (ATTRA, 2004)
<http://www.attra.org/attra-pub/organiccrop.html>
- Organic Crops Workbook (NCAT, 2003)
http://attra.ncat.org/new_pubs/attra-pub/PDF/cropsworkbook.pdf
- Price Premiums Hold on as U.S. Organic Produce Market Expands (USDA, 2005)
<http://www.ers.usda.gov/Publications/vgs/may05/VGS30801/>
- Resource Guide to Organic and Sustainable Vegetable Production (ATTRA, 2001)
<http://www.attra.ncat.org/attra-pub/vegetable-guide.html>
- Southern Organic Resource Guide (ATTRA)
<http://attra.ncat.org/sorg/>

Web sites

- Kentucky Department of Agriculture Division of Value-added Plant Production: Organic Program (KDA)
<http://www.kyagr.com/marketing/plantmktg/organic/index.htm>
- Alternative Farming Systems Information Center: Organic Food Production (USDA, 2007)
<http://www.nal.usda.gov/afsic/ofp/>
- Appropriate Technology Transfer for Rural Areas (ATTRA)
<http://www.attra.org>
- National Organic Program (NOP)
<http://www.ams.usda.gov/nop>
- Organic Materials Review Institute (OMRI)
<http://www.omri.org>
- Sustainable Agriculture and Research Education publications (Sustainable Agriculture Network)
<http://www.sare.org/publications/index.htm>
- Southern Sustainable Agriculture Working Group
<http://www.ssawg.org>