



# Planning the Transition to Organic Crop Production

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*A guide to planning the transition from conventional to certified organic production, including focus on farm and financial resources, record keeping, and transition strategy.*



This guide will aid farmers in assessing their current and intended operations and choosing practices for a successful transition to organic production, including management of weeds, soil fertility, and crop rotations.

Selected links and downloads of resources for planning the transition to organic production are provided at the end of this NebGuide and are cited by number. Comprehensive resources include the Midwest Organic and Sustainable Education Service's *Guidebook for Certification*,<sup>1</sup> Sustainable Agriculture Research and Education's *Organic Transition, A Business Planner for Farmers, Ranchers and Food Entrepreneurs*<sup>2</sup> and USDA's *Sound and Sensible* resources.<sup>3</sup>

The first steps in planning the transition (*Figure 1*) are to understand the USDA National Organic Program (NOP) regulations and to supplement the internet resources by talking with organic farmers, reviewing research relevant to your region, and consulting a certifying agency.

For the text of NOP regulations, the reader is referred to complementary NebGuides, *Transitioning to Organic Farming* (G2145) and *Developing an Individual Organic System Plan* (G2146), and USDA publications.<sup>4</sup> For insights and updates on the regulation of synthetic materials in organic crop and livestock production, review the National Organic Standard Board (NOSB) recommendations<sup>5</sup> and USDA's *Final Guidance on Materials for Organic Crop Production*.<sup>6</sup>

## Prepare to Meet Organic Certification Requirements

An organic certifying agency should be chosen and regularly consulted during the transition to ensure that plans follow NOP regulations. USDA maintains a list of certifying agencies. Some certifying agencies provide monitoring and guidance for the transition process through programs separate from their NOP certification program.

A 36-month transition period, from the last day of application of any prohibited material to the first day of harvest, is required to apply for USDA certification for organic crop production. During this period, many conventional inputs, including chemical fertilizers, pesticides, sewage sludge, and transgenic (GMO) seed, cannot be used. Until the third year, no monitoring by a certifying agency is required. Prior to certification, an "Organic System Plan" must be prepared using forms supplied by the certifying

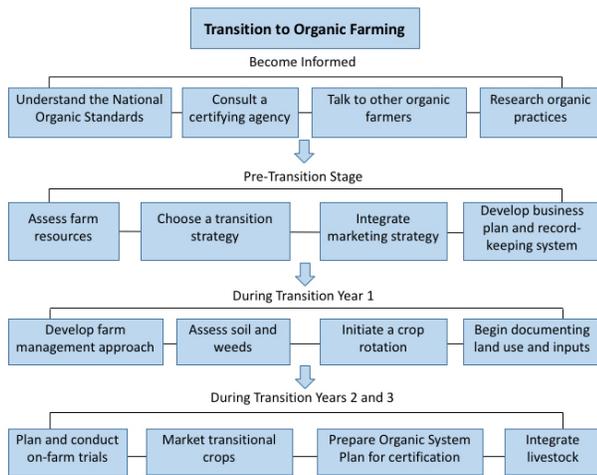


Figure 1. Flowchart for planning the transition to organic farming.

agency. The Organic System Plan is your application for certification.

“Agricultural products that are sold, labeled, or represented as organic must be produced and processed in accordance with the NOP standards.”<sup>7</sup> Operations with greater than \$5,000 annual gross income from organic sales must be certified by a USDA-accredited agency. Products certified under NOP regulations can be marketed as organic in the European Union, Japan, Switzerland, Canada—and potentially Mexico—without additional paperwork. Japan and Korea have special requirements.

### Assess Farm Resources

Review available resources and determine those needed for the organic operation. Here are key questions to consider:

- Will the organic operation include livestock?
- Will the livestock component transition to organic simultaneously with the crops or later?
- Can livestock be added via ownership or by partnering with another farmer?
- Are storage facilities adequate for additional crops, or for segregating organic and conventional crops?
- Which crops and practices for the transition phase can best prepare the land for organic production, such as reducing weed populations or improving soil nutrient availability?
- How will soil fertility be managed using rotations, cover crops, and application of organic materials (as directed by NOP regulation 205.203)?

- Are affordable organic nutrient sources accessible?
- Will the planned crop rotation require additional equipment or labor?

### Choose a Transition Strategy

A strategy of gradual conversion of the whole farm to organic certification is recommended to allow time to acquire management skills, to adopt an organic mindset (see the later section, “Develop Farm Management Approach”), and to allow conventional production to support the farm until the first crops from converted fields qualify for organic markets.

Farmers may opt to farm both organically and conventionally on different fields. Prohibited farm inputs and crops produced with a prohibited substance must be stored in separate facilities than organic inputs and produce. For example, treated grain or seed cannot be allowed any opportunity to comingle with organic grain. After any operation in conventional fields, equipment must be thoroughly cleaned before moving to transitional or organic fields to prevent contamination from conventional products. Cleaning of equipment, and procuring, handling, and storing of organic inputs and produce must be carefully documented.

A buffer strip, usually 25 feet, is required between organic and conventional land. One can use the same crop as the field for buffers, but must be kept separate. Harvest equipment must be cleaned between buffer harvest and field harvest. Grass buffer strips provide convenient harvest segregation, hay, or grazing options, less scrutiny on the part of inspectors, and also provide a nice alley for access for field monitoring, compost storage, and cattle feeding and watering.

Conversion of land to organic production can be facilitated by:

- Selecting land with the least limiting natural conditions (fertility, drainage, soil physical properties) and with low insect and weed pressure for initial organic transition. Early years of transition may benefit from nutrient carryover from previous conventional practices.
- Planning for additional acres to be brought into production as organic farming experience increases. The land should be easy to access for daily observation of weeds and for timely intervention with equipment.
- Converting land that has been in a perennial legume/ grass crop or CRP for the last three years, which can be immediately certified if no prohibited substances were used (with lead time for paperwork and inspection). A perennial

crop may provide soil nitrogen from a legume, enhance soil physical properties from grass root biomass, suppress perennial weeds, and reduce annual weed populations.

- Subdividing fields to spread out the workload and the risks associated with each crop. For example, for a six-year rotation, split the land into six fields that represent each phase of the rotation.

### **Integrate Market-Based Strategy**

Consider your marketing strategy early in the transition process. Marketing decisions may determine the type of farming system that you will develop. Systems such as grass-fed livestock<sup>8</sup> and low-tillage vegetable systems<sup>9</sup> are attractive for both the enhanced income potential and for meeting soil fertility and weed management challenges without pesticides. Intensive rotational grazing plus season-extending forage crops can provide access to premium markets for grass-fed meat, improve soil productivity, and eliminate many costs associated with annual crop production. Mulch-based systems using crimped rye or triticale can curb early-season weeds and have shown promise for soybeans and high-value crops like cucurbits (pumpkins and squash), tomatoes, cabbages, and green beans.

Marketing of transitional produce is a challenge. Produce from the second and third years of transition may be marketed as “transitional” as long as the word “organic” is not used. Several certifying agencies have programs for transitional verification. At least one certifying agency offers “transition certification.” The Organic Trade Association is working with NOP to develop transition certification. A nationwide “Transition to Organic Network” may help locate markets for “transitional” products.<sup>10</sup> There is a growing non-GMO market for these products, especially for feed needed by farmers who are direct marketing livestock and poultry.<sup>11</sup>

### **Develop Business Plan and Record Keeping System**

A multiyear enterprise plan (with a lender, if needed) can be written using a business plan outline for transition-to-organic farms on the free AgPlan interactive website.<sup>12</sup>

Prices and yields are a critical component of any budget. A typical lender may not be familiar with organic prices or yields and may require documentation with ranges of potential and expected values to assess financial risk. The *Organic Transition* planner<sup>13</sup> and accompanying spreadsheets<sup>14</sup> may be useful in preparing an extensive, realistic, and multiyear farm budget and cash flow analysis that

includes marketing of organic crops. Other resources for a detailed analysis of the proposed farming system include the Systemwide Crop Enterprise Budgets Excel workbook,<sup>15</sup> the FINBIN farm financial database,<sup>16</sup> and the National Organic Grain and Feedstuffs Price Report.<sup>17</sup>

Record keeping can have a steep learning curve to comply with certifiers and requires extra time. An audit trail from seed to harvest, including sales and inputs, is required. Consult with the organic certifying agency for record requirements.

Some financial considerations during the three-year transition period are the potential for:

- Increased labor costs for cultivating or pulling weeds for weed control (in place of herbicides).
- Lower crop yields when growing commodity crops during the transition. Yield penalties<sup>18</sup> during transitional years in several studies in Corn Belt states ranged from 7 to 29 percent for corn, 0–34 percent for soybeans, and 11–23 percent for wheat. Yield penalties during the transitional period are attributed to increased competition with weeds and late planting.
- Losses or gains in federal subsidy options, including Whole Farm Revenue Insurance.<sup>19</sup> Discuss current availability with your local USDA Farm Service agent.
- Financial assistance for conservation practices. The NRCS-EQIP Organic Initiative provides technical and financial assistance to farmers for many practices that may aid the transition to organic production.<sup>20</sup>

### **Develop Farm Management Approach**

Converting to an organic system will involve changes in mindset and management habits, and is not a simple process of replacing the use of synthetic fertilizers with animal manures, or replacing herbicides with cultivation. It involves changing how one thinks about producing plants and animals, management, and marketing from an approach of using a “Band-Aid” or “silver bullet” solution for a specific problem to a more holistic approach. The solution to a persistent weed or insect problem may require several management adjustments over several seasons. Experimentation may be necessary on smaller plots to assess options. Consider partnering with university researchers and recovering costs through programs with SARE,<sup>21</sup> Ceres Trust,<sup>22</sup> or OFRE.<sup>23</sup>

Organic farms typically are more diverse than conventional farms with more crop species and enterprises,

requiring additional management knowledge and skills in weaving them together in a successful organic system. Habits of observation, flexibility, and timely intervention become more demanding as the farm becomes more diverse with the expectation of achieving a mature farming system within several years that will require gradually decreasing work and attention.

### *Weed Management*

Weed management for annual crops may be the greatest challenge in the transition phase. Weed pressure in organic farming is likely the most limiting yield constraint and may create harvest problems. A conventional farmer may strive to eliminate weeds. This is usually not possible in organic farming. However, organic farmers often find benefits from weeds such as providing habitat to beneficial insects and providing ground cover. Weeds are managed rather than eliminated from fields through the integration of cultural and mechanical means.

Weed management during the transition and organic phases may require a diverse “toolbox” of tillage equipment and may include crimping and flaming equipment to have the right tool available for specific soil and weed conditions.

Timing of tillage and flaming operations is extremely important in organic weed management, and the window of opportunity is often short.

Organic farmers may plant later for quicker crop growth to shade and suppress weeds. Row spacing may be increased to allow for better mechanical weed control or may be decreased to create early canopy cover and shading of weeds.

In-season cultivation of row crops to replace herbicides will increase the potential for erosion and the need for conservation practices to minimize soil loss. Terraces, strip cropping, non-row crops, intercrops, and off-season cover crops may help conserve soil. Propane flaming to kill small weeds in row crops will potentially reduce tillage and thus protect soil.

### *Soil Fertility Management*

Application of processed chemical fertilizer is not allowed in organic systems. Soil nitrogen availability must be maintained through a combination of legume crops and the application of manure and other allowed products. Free software is available for determining nutrient contributions

from manure and developing nutrient management strategies.<sup>24</sup> Legumes such as soybean, alfalfa, pea, vetch, and clover can be used to biologically fix atmospheric nitrogen. Perennial legumes with more extensive root systems and longer growing seasons will fix more nitrogen than annual legumes, but may also use more water.

Phosphorous that is removed from the farm system each year in the produce must at some point be replaced by applying manure or compost from off the farm, or by applying large amounts of low-solubility rock phosphate or other approved amendments. If the crop rotation does not allow for adequate biological N fixation, heavy reliance on manure as an N source may result in excessive application of P and K that will cause potential problems with nutrient runoff. To avoid these problems, manure and other soil nutrient application should be based on periodic soil test results.

Manure or compost application is usually done prior to the most N demanding crop in the rotation. With the exception of alfalfa, harvested legumes alone usually don't supply enough nitrogen for subsequent high-yield corn or high-protein wheat. Manure or compost application should be planned in advance to comply with NOP regulation §205.203(c)(1). When producing for human consumption, manure should be applied four months prior to harvest if the crop product has soil contact (e.g., potato) or three months if it does not (e.g., sweet corn).

### *Crop Rotations*

Rotation of crops is very important for managing soil productivity and pests, integrating livestock, and maintaining profitability. The most suitable rotation for a farm will vary with the farmer's interest, location, crop adaptation, and available markets. The following are potential best management practices for organic production.

- Budget to include a nitrogen-fixing cover crop in the rotation in addition to the perennial crop used during the transition period.
- Deplete annual weed populations by alternating two successive years of cool season crops (e.g., small grains, field peas) with two successive years of warm season crops (e.g., corn, soybeans, sorghum).<sup>25</sup>
- Deplete perennial weed populations by including three years of perennial forage crops in succession that are

mowed regularly or intensively grazed. Perennial forage grasses, especially high biomass hybrid wheatgrass, have been effective in suppressing Canada thistle in western Nebraska.

- Alternate shallow with deep-rooted crops to make better use of soil water in the entire soil profile. When deep-rooted crops, e.g., daikon radish cover crop, die, the decaying roots leave channels that may enhance water infiltration and percolation through the soil.
- Alternate annual with perennial crops, cereals with legumes, summer crops with winter crops, or other sequences of dissimilar species. Rotating among different crop families breaks life cycles of insect pests. Perennial vegetation whether as a crop or in field boundaries provides habitat that may favor beneficial insects.
- Incorporate cover crops into the rotation to maintain soil cover, build soil organic matter, and manage crop nutrient availability. University research on cover crops has been revived following relatively low interest since the 1980s, and information from past research and experience has been compiled.<sup>26</sup>

### Rotations for Eastern Nebraska

An organic crop rotation for eastern Nebraska may begin with a perennial legume or legume-grass mix (Figure 2). Following the perennial legume, a traditional corn-soybean sequence can be followed with winter wheat, then soybean, and then return to two or three years of alfalfa or red clover. If soil water content is adequate, a crop with high nitrogen demand (corn or wheat) may follow alfalfa. If corn (or popcorn) is chosen to follow winter wheat, nitrogen can be supplied by applying manure or by growing a winter annual legume cover crop such as hairy vetch after the wheat.

Including cool season grasses, such as brome grass or orchard grass, with a perennial legume will add substantial root biomass to improve soil aggregation for improved water infiltration and retention, as well as add resistance to erosion and crusting. Alfalfa is likely to dominate the mix by the third year, more so than some other legumes such as red clover. If grass dominates at the termination of the perennial crop, follow with soybean or another crop that requires minimal nitrogen, as the grass biomass will immobilize nitrogen. If soil water is depleted at the termination of the perennial crop, follow with soybean or another crop that requires less water than corn or wheat.

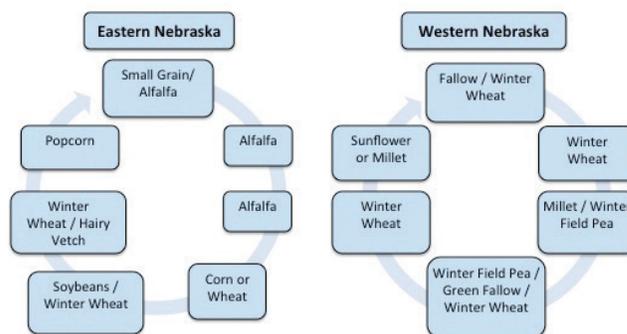


Figure 2. Organic crop rotation examples.

### Rotations for Western Nebraska

In semiarid areas, maintaining adequate soil water without irrigation is a major challenge. In older conventional dryland systems in western Nebraska, the land was typically fallowed for a year prior to the wheat crop to conserve soil water for the wheat. Rotations with fallow once in three years are currently common with the flexibility of choosing millet, sunflower, or field pea as the crop in the year following winter wheat harvest.

Winter field pea grown every other cycle as a green manure crop and terminated in June can add nitrogen and organic material to the soil but may deplete soil water. The land is then fallowed until wheat is planted in early September. The annual legumes Laramie annual medic and fenu-greek will produce less biomass in western Nebraska than field peas, and hence, may use less water as a green manure than field peas.

### Integrate Livestock

Livestock must have free access to certified organic pasture for a minimum of 120 days each year, and as long as the grazing season lasts for a particular area and climate. For the duration of the grazing season, livestock must obtain an average of 30 percent of their dry matter intake from grazing certified organic pasture (Figure 3). During the final fifth of their lives, ruminant animals are exempt from the 30 percent dry matter requirement. Livestock during this finishing period, which can be no longer than 120 days, must still have free access to grazing if the finishing period coincides with the grazing season.

The minimum dry matter requirements (30 percent from grazing during the grazing season) may pose a challenge for some farming operations transitioning to



Figure 3. Grazing just before termination of a perennial grass/legume crop as part of the crop rotation.

organic. If the availability of certified organic pasture is limited, requirements can be met by improving the quality and productivity of the pasture, for example, with intensive rotational grazing, or by grazing annual forage crops. The pasture, as well as the soil, can be improved with short periods of intensive grazing followed by an un-grazed growth period with the animals moving across five or six parcels, and if pasture growth is adequate, a second later grazing period. In eastern Nebraska, grazing the perennial grass/legume phase of the rotation will enable a smooth organic transition for both land and livestock except that crops for feeding livestock beyond the grazing season will not be harvested until late in the first year of certification. Festulolium, a cross between meadow fescue and perennial ryegrass, may improve the grazing potential of the perennial forage.

Livestock certification requires that organic practices be used from the last third of gestation for breeding mammals or the second day of life for poultry. Calving must be timed

to occur no earlier than 26 to 28 weeks after land certification to meet the one-third-gestation requirement. Beef and other slaughter livestock must be born and managed on certified organic land.

It is recommended that livestock operations certify their farms first and then certify their livestock the next year to meet the above requirements and for best timing of on-farm availability of organic feed grain.

Timing of the submission of a livestock application for certification is important. Organic inspection of new ruminant livestock herds must occur when pasture conditions, including annual forage crops, may be verified on-site. Dairy animals must be managed organically for 12 months before milk or milk products can be sold as organic. It is possible to certify dairy animals and land simultaneously, in which case the livestock inspection must take place during the pasture season of the third year of transition. Dairy animals can receive third year transitional feed from the operation (but not from off the farm) during their one year transition to dairy production. However, once the dairy animals are certified, transitional grain is no longer allowed, and it might be necessary to buy organic feed until the first on-farm harvest of organic feed.

## Notes

1. *Guidebook for Certification*. <https://mosesorganic.org/publications/guidebook-for-certification/>
2. *Organic Transition, A Business Planner for Farmers, Ranchers and Food Entrepreneurs* can be found at <http://www.sare.org/Learning-Center/Books/Organic-Transition>. Related tools and resources found at <http://eorganic.info/toolsfortransition/reports>. The SARE (*Sustainable Agriculture Research and Education*) website is <http://www.sare.org/>.
3. *Sound & Sensible*. Resources from USDA project with 14 contractors to make organic certification more accessible. <https://www.ams.usda.gov/reports/sound-sensible>.
4. *National Organic Program Handbook* is available at <https://www.ams.usda.gov/rules-regulations/organic/handbook>. More on *Organic Livestock Requirements* at <https://www.ams.usda.gov/sites/default/files/media/Organic%20Livestock%20Requirements.pdf>.
5. *NOSB Recommendations* are available at <https://www.ams.usda.gov/rules-regulations/organic/nosb/recommendations>.
6. *Final Guidance on Materials for Organic Crop Production*. See <https://www.ams.usda.gov/content/usda-issues-final-guidance-materials-organic-crop-production>, <https://www.ams.usda.gov/sites/default/files/media/NOP-5033.pdf>, and <https://www.ams.usda.gov/sites/default/files/media/NOP-5034.pdf>.
7. *National Organic Program Handbook* is available at <https://www.ams.usda.gov/rules-regulations/organic/handbook>.

8. *Organic Beef*. Resource links from the Agricultural Marketing Resource Center at <http://www.agmrc.org/commodities-products/livestock/beef/organic-beef/>
9. *Organic Certification of Vegetable Operations*. Download at [http://www.extension.umn.edu/garden/master-gardener/volunteers/teaching-tools/docs/organic\\_certification\\_for\\_vegetables.pdf](http://www.extension.umn.edu/garden/master-gardener/volunteers/teaching-tools/docs/organic_certification_for_vegetables.pdf). For *No Tillage Vegetable Production Research* see <http://notillveggies.org/about/>.
10. Register for the *Transition to Organic Network* listserv at <http://goo.gl/forms/iTPJTpeiSa>.
11. More on the *Nebraska Food Cooperative* at <https://www.nebraskafood.org/>.
12. Overview of AgPlan is available at <http://cffm.umn.edu/products/AgPlan.aspx>. Register and obtain free access to the interactive website at <https://agplan.umn.edu>.
13. *Organic Transition, A Business Planner for Farmers, Ranchers and Food Entrepreneurs* can be found at <http://www.sare.org/Learning-Center/Books/Organic-Transition>. Related tools and resources found at <http://eorganic.info/toolsfortransition/reports>.
14. *Current and Projected Whole Farm Financial Spreadsheets*. Found at <http://eorganic.info/toolsfortransition/reports> for download as Excel spreadsheets. The *Systemwide Crop Enterprise Budgets* can be downloaded as an Excel workbook at <http://farm.unl.edu/articles/systemwide-crop-enterprise-budgets>.
15. The *Systemwide Crop Enterprise Budgets* can be downloaded as an Excel workbook at <http://farm.unl.edu/articles/systemwide-crop-enterprise-budgets>.
16. *FINBIN* farm financial database is available at <http://cffm.umn.edu/products/FINBIN.aspx>.
17. The *National Organic Grain and Feedstuffs Price Report* can be downloaded at <https://www.ams.usda.gov/market-news/organic>.
18. Clark, S. 2009. "The Profitability of Transitioning to Organic Grain Crops in Indiana." *American Journal of Agricultural Economics* 91(5):1900. doi: 10.1111/j.1467-8276.2009.01372.x.
19. *Help for Organic Farming*, Farm Service Agency financial assistance program information, <https://www.fsa.usda.gov/programs-and-services/outreach-and-education/help-for-organic-farming/index>.
20. *EQIP Organic Initiative and Conservation Activity Plans*. See [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs143\\_008224](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs143_008224) and [https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/about/?cid=nrcs142p2\\_046679](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/about/?cid=nrcs142p2_046679).
21. The *SARE (Sustainable Agriculture Research and Education)* website is <http://www.sare.org/>.
22. The *CERES Trust* website is <http://cerestrust.org/>.
23. The *OFRF (Organic Farming Research Foundation)* website is <http://ofrf.org/>.
24. More on *Software for Manure Management Planning and Whole Farm Nutrient Balance Calculations* at <http://water.unl.edu/manure/software>.
25. For *Integrated Cropping Systems Research*, see the publications of Randy Anderson, USDA, North Central Ag Research Lab at <https://www.ars.usda.gov/people-locations/person/?person-id=143>.
26. See *Nebraska Cover Crop Research* at <http://cropwatch.unl.edu/cover-crops>. For the *Midwest Cover Crops Council's* selector tools, publications, and events, see <http://mccc.msu.edu/>.

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