Evaluating Organic Transitions at the Field Level

This publication is a companion piece to the Microsoft Excel workbook available on the <u>Iowa</u> <u>State University Extension and Outreach Ag</u> <u>Decision Maker website</u> (extension.iastate.edu/agdm/ crops/xls/a1-96organictransition10year.xlsx). For background information on organic transitioning, developing organic budgets, and other topics related to organic production, see the list of resources at the end of this document.

The companion Excel workbook contains three primary components: the crop plan, the summary of results, and a series of individual crop budgets. A producer contemplating transitioning their farm from a conventional to an organic cropping system should start with the development of the crop plan.

Transition crop plan

The crop plan outlines the cropping sequence (i.e., crop rotation) during the organic transitioning period as well as the period when the producer is selling organically certified crops. Year 0 indicates the crop that is currently on the field to be transitioned. Year 1 refers to the first transitionyear crop and Year 2 refers to the second transitionyear crop.

Organic certification requires, among other things, that no prohibitive substances may be applied to the land for 36 continuous months. However, if timed correctly, the 36-month period may be covered while producing only two transition crops. For example, assume the last prohibitive substance was applied in August 2019 on a soybean crop. The following year, oat were co-planted with alfalfa (transition year 1) and then alfalfa was harvested during 2021 (transition year 2). For more information see the <u>Iowa</u> <u>State Organic Program website</u> (http://extension.agron. iastate.edu/organicag), and the <u>United States Department</u> of Agricultural-Agricultural Marketing Service (USDA-<u>AMS) National Organic program website</u> (www.ams. usda.gov/about-ams/programs-offices/national-organicprogram).

In 2022, corn was planted, and as of August 2022 no prohibitive substances had been applied and the land became eligible for organic certification. The corn crop harvested in October 2022 (assuming all the paperwork was completed) can be sold as organically certified. Only two transition crops (oat and alfalfa) were needed to complete the 36-month transition period; the thirdyear crop (corn) could be sold as organically certified.

Years 4-10 of the crop plan continue the organic rotation as designed. The sample rotation starts with a conventional soybean crop and then transitions with oat and alfalfa, followed by an organic corn-soybeanoat/alfalfa-alfalfa rotation. A two-year transition followed by a four-crop rotation allows the organic rotation to be completed twice within the 10-year period.

The crop plan indicates the transition starts with oat and alfalfa seeded together, with the oat harvested in the seeding year along with one cutting of alfalfa. Oat is selected to control weeds and begin the process of developing soil tilth. Oat is followed by alfalfa to provide corn with a nitrogen source. Weed management is the primary concern during the transition period, which is why transitions do not typically start with a row crop such as corn or soybean. In addition, nutrient management is a secondary concern, and having enough available nitrogen for a crop like corn would likely be problematic.

Individual crop budgets

Twelve completed crop budgets and four blank budgets are provided in the workbook. Each budget is linked back to the results summary page. Changing any individual budget item will also change the transition or organic profitability summary. Each individual budget has six sections: receipts/revenues, pre-harvest machinery, crop inputs (seed, fertilizer, etc.), harvest machinery expense, labor, and land.

Cash receipts are simply yields multiplied by the sales price per unit. Yields and prices can vary significantly by geographic region. It is important to replace the numbers currently in the budgets with numbers representative of the region where the farm is located.

Pre-harvest machinery expenses represent fixed and variable cost components for the field operations conducted. Changing field operations within the budget will change the cost of growing a specific crop. For estimates of fixed and variable components of machinery see ISU Extension and Outreach publication *Estimated Costs of Crop Production in Iowa – 2020* (FM 1712) (store.extension.iastate.edu/Product/1793). If the field operation conducted is not on the list, choose one from the list that would be similar in tractor horsepower needed and field speed of the operation.

Crop inputs consist primarily of seed and fertilizer costs (plus chemical costs for the conventional budgets). The actual seeding rate and cost per unit for the transitioning farm should be used rather than the estimates represented in the budgets. Additional lines are available for cover crops or companion crops seeded with the primary crop. If the additional seeding was conducted separately from the primary seeding operation, a field operation and the associated costs for that operation should be added to the budget.

The fertility section of the budget reflects the costs associated with the amount of nutrients the crop will receive. The sample transitional corn budget, for



example, indicates that 60-30-50 units of nitrogenphosphorus-potassium (N-P-K) were applied to the corn crop. The units could be achieved through a variety of composts or manures. The amount applied of the various sources would vary by the nutrient value per ton or pound of the material. For example, the 60-30-50 could be achieved by applying dry chicken manure, dry beef or dairy manure, liquid swine manure, or composted manure. The delivery method would vary by the chosen manure source along with the associated cost of application.

The sample budget indicates a dry manure application field operation (e.g., bulk dry fertilizer spreader). The amount of chicken manure applied in this case was accomplished with one field operation per acre. If the farm instead applied 12 tons of dry beef manure, multiple trips would be required and an additional field operation (and associated costs) should be added. Other input costs include estimates for crop insurance (for the specific crop, not whole-farm), miscellaneous expenses, and interest on pre-harvest expenses. The interest is calculated as the number of months an operating loan would likely be needed at the market rate of interest. As with other expenses, these estimates should be replaced with the actual expenses incurred by the transitioning farm.

Harvest expenses are those associated with combining (or other harvest operations), drying (in the case of corn), hauling, and handling. These estimated peracre or per-unit expenses can be found in FM 1712. Labor expenses are simply an estimated wage rate multiplied by the number of hours needed to conduct the particular field operations (including harvest and hauling). Hours needed for various field operations can be found in ISU Extension and Outreach publication <u>Estimating Field Capacity of Farm Machines</u> (PM 696) (store.extension.iastate.edu/Product/4032).

Note the times listed are acres per hour. These numbers should be transformed into hours per acre. These times do not take into consideration irregular fields, time to and from fields, or downtime for repairs. Adjustments to these times should be made to reflect the transitioning farm. However, the adjustments to each of the individual crops within the transitioning farm incur similar adjustments (e.g., it will take the same amount of time to go to and from the field whether the crop is corn or oat).

Land charges can be estimated one of two ways. For Iowa State University budgets, a cash rent equivalent is often used. The equivalent would reflect the rental rate paid to a landlord or the amount an owner could receive renting the land to another farmer. The idea is that even if the land is owned, it should provide an economic return for its use. The second way land charges can be entered is to summarize all land expenses such as property taxes, interest on land loans, and any land improvement expenses. Then divide the total by the number of acres to which those expenses apply, in order to determine a per-acre land expense.

Once all sections are complete total variable and fixed costs are calculated, as well as a per-unit variable and fixed cost, by using the yield given in the revenue section.

Results summary

In the Summary tab of the workbook, located under the previously discussed crop plan, is a series of tables. The Annual Return by Crop (dollars per acre) section highlights financial indicators for each of the 16 individual crop budgets. Receipts (total revenue), total costs, return over total costs (also referred to as return to management), break-even price, and break-even yield are linked from the crop budgets. Changing any input in any of the crop budgets will alter the summary results. Break-even price and yield are calculated for crop budgets that include only one crop sold in a single year.

The second section of the results summary indicates the financial summary for each year within the two-crop year transition period and eight-year certification period. Average returns for the transition and certification periods also are included. Changing individual line items within budgets will affect the economic performance for those budgets. Changing rotations will affect the returns for each individual year of the crop rotation summary, as well as any averages using the individual cropping year budgets.

The third section illustrates transitional and certified organic two- and eight-year averages, respectively, and a sensitivity analysis using a pre-selected percentage change. The sample illustration uses a 10% higher and lower calculation on receipts. The assumption is that most costs (land, labor, pre-harvest machinery, crop inputs, etc.) are sunk costs by harvest time and therefore will not vary significantly. However, yields and prices could change significantly from the beginning of the crop year to the end and therefore have a larger impact on return to management.

The last section indicates the average receipts and economic returns to a conventional rotation, including a sensitivity analysis on receipts. The conventional rotation in this example is a two-year rotation of corn and soybean. Changing the transition or organic certified budgets or crop plan will not affect the results of the conventional rotation. Only changing one or more of the input lines on the individual conventional corn or soybean budgets will alter these numbers.

Limitations

As indicated previously, the expenses listed in the individual crop budgets are estimates. The estimates for transitional and organic corn, soybean, oat/alfalfa, and alfalfa budgets are based on research conducted in Iowa for that specific rotation. Altering the cropping sequence so the transition/organic rotation is a corn-soybeancorn-wheat-alfalfa budget, for example, will affect the various individual budgets. For example, the second corn budget will likely need more fertility, as soybean crops do not provide as many nutrients as a forage crop like alfalfa. Additionally, a corn crop following soybean does not need a moldboard plow as primary tillage, and because there are now three row crops in a row, more post-plant mechanical field operations will likely be needed. In other words, altering the crop rotation into alternative crop sequences will require adaptations to the current budgets. Review research and talk to production experts to better understand how to adapt the existing budgets.

The small grains budgets (oat and wheat) have a "toggle" toward the top of the budget (i.e., if companion crop, enter "1", otherwise "0"). This toggle is included to accurately allocate the costs of establishing the small grain crop. For example, if a companion crop was seeded with the small grain (e.g., alfalfa) and that companion crop will be harvested the following year, the cost of establishing the small grain/companion needs to be allocated between the two years. If there are no subsequent crop harvests (i.e., no companion crop will be harvested the following year), then all costs of establishing the small grain crop must be allocated to that crop instead of shared between the two crops.

No adjustments are included in the workbook for inflation or time value of money. An organically certified corn crop in Year 3 costs the same as in Year 7. Additionally, the yields and prices received for Year 3 and Year 7 also would be the same.



No adjustments are included in individual crop budgets or rotations for regional differences. Regional differences do occur in yields, prices received, and some costs. Differences in usage of specific small grain, forage, or legume crops vary throughout the Midwest. A transitioning farm in central Minnesota may look at different rotations than a farm in southern Iowa. Spending time to conduct market research on organic contracts, seasonality of prices, transportation expenses to various markets, and more will allow the actual prices received to be more accurate than the current estimates. Inputting specific field operations, regional yields based on climatic and soil types differences, and regional land costs will improve overall crop receipt, expense and economic return estimates.

The year-by-year profitability estimates are based on one crop planted and harvested per year as specified in the crop plan. Previous organic transitioning tools such as ISU Extension and Outreach publication <u>Making the</u> <u>Transition from Conventional to Organic</u> (FFED 0026) (store.extension.iastate.edu/Product/12936) estimated profitability of the whole farm, which often included a combination of conventional, transitional, and organically certified crops. This specific decision tool estimates field profitability completely determined by one specific crop planted and harvested. No estimates of overall farm profitability are possible given the focus on one field within a farming operation.

Resources

Chase, Craig, Kathleen Delate, and Olivia Hanlon. 2019. *Economic Analysis of Two Iowa Crop Rotations*. FFED 20. Ames: Iowa State University Extension and Outreach.

Chase, Craig. 2019. *Adapting Enterprise Budgets for Organic Crops.* FFED 23. Ames: Iowa State University Extension and Outreach.

Chase, Craig, Kathleen Delate, and Olivia Hanlon. 2019. *Making the Transition from Conventional to Organic.* FFED 26. Ames: Iowa State University Extension and Outreach.

Chase, Craig, Kathleen Delate, and Olivia Hanlon. 2019. *Organic Crop Production Enterprise Budgets*. FFED 27. Ames: Iowa State University Extension and Outreach.

ISU Organic Program website: <u>http://extension.agron.iastate.edu/</u> organicag

USDA-AMS-National Organic program website: <u>www.ams.usda.</u> <u>gov/about-ams/programs-offices/national-organic-program</u>

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