Economics of Organic Transition: The Ohio Experimental Results

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The transition to organic production is a challenging and risky activity. Weed and pest management are well documented management challenges during conversion. How well these challenges are handled will have a substantial impact on the economics of the farming business. One of the objectives of this project was to study the economic performance of the farm during transition and to investigate the private economic net returns for transitional and conventional farm production.

Economic profitability is estimated for each of the four organic and two conventional crops grown each year of the study. Actual crop yields from experimental plots are used. Conventional commodities are valued at the average price received by Ohio farmers for that season. Transitional organic crop prices varied depending on the crop. A food grade corn was produced in the transition experiment, and was assumed to earn a small ($0.15/bu) premium over conventional feed grade corn. Transitional soybeans were assumed to sell for $8.75 and $8.00 per bushel during the first and second years of transition. Oats and hay were assumed to earn the same price as for conventional producers. During the third and subsequent production years, all organic crops were eligible for marketing as organic commodities, and organic prices were used based on local marketing conditions.

All variable inputs were measured and valued at their market or opportunity prices. For inputs not purchased from the market, opportunity cost concepts were used to value the input. Land was valued at the cash rental rate in local markets. Labor was valued at a rate consistent with local labor markets.

The fixed costs of machinery and equipment are important but difficult to evaluate in experimental situations. Per acre costs of fixed assets can only be calculated when farm size is known. However, making assumptions about farm size, or the rate of conversion of conventional farmland to organic production limits the usefulness of our study to the broad range of interested farmers. Instead of calculating the costs of ownership and operation of farm equipment, we have used a market-based custom rate for all machinery services provided. This market determined rate should provide for the cost of machinery ownership, fuel and other operating expenses, cost of the operator's labor, and a normal return on investment for the custom equipment operator. This may be less costly than ownership for small firms, but is likely to be more costly than ownership for large farms that can fully utilize the machinery complement. Because the custom rate includes a charge to recover the cost of fuel, other operating costs, and the machine operator's labor, these items are not otherwise included in our profit calculations. Table 1 provides a summary of profit for each crop produced in each year of the study.

In order to evaluate the performance of alternative transitional crop rotations, net present value analyses were used to calculate the profitability outcomes for each of the four transitional and the two conventional rotations. In order to capture some information

about risk, a net present value (NPV) was calculated for each of the six replicate plots individually. The NPV value represents a single number that estimates the profitability of the investment over the first four years of operation for each rotation. An NPV of zero signifies breakeven performance, and positive NPVs signify profitability. Care should be used in interpreting these results since weather was highly variable during this time, the financial impact of poor or good weather may be strongly related to a particular crop, and we have only a single observation for each rotation. Still, there are some interesting comparisons of performance among the four transitional rotations.

Table 1. Average profitability by crop and year

Year	Measure	Conventional Corn	Conventional Soybeans	Transitional Corn	Transitional Soybeans	Transitional Oats	Transitional Hay
2000	Yield	135.92	46.46	131.65	27.87	100.10	4.42
	Total Receipts	237.86	208.12	250.14	243.85	195.14	375.97
	Return above all costs	-62.51	33.56	-35.36	-13.98	-3.72	176.00
2001	Yield	147.72	57.00	150.32	20.75	72.90	3.29
	Total Receipts	274.75	238.26	302.14	166.00	182.48	263.35
	Return above all costs	-31.38	76.25	12.70	-184.01	-30.63	22.70
2002	Yield	22.80	33.45	61.73	30.55	2.63	3.29
	Total Receipts	55.40	176.28	293.23	549.90	52.68	263.35
	Return above all costs	-223.31	14.01	30.25	289.17	-119.33	16.25
2003	Yield	152.82	62.73	105.23	47.38	53.92	4.94
	Total Receipts	325.50	417.80	526.17	734.44	221.77	395.39
	Return above all costs	24.30	254.62	249.64	434.95	14.40	207.18
2004	Yield	175.60	53.13	127.40	31.64	38.72	4.00
	Total Receipts	388.08	299.67	700.70	490.39	233.48	320.00
	Return above all costs	79.00	136.79	445.85	280.29	23.52	121.24

Table 2. NPV for a four year period for alternative production methods and rotations.

Production System and Rotation	NPV				95% Confidence Interval for Mean NPV	
	Min	Max	Mean	Std Dev	Lower	Upper
Conventional						
CBCB	-191.33	231.37	26.20	140.22	-86.00	138.40
BCBC	-86.11	114.98	35.59	63.62	-15.32	86.50
Transitional						
CBOH	-222.57	-47.70	-133.22	57.47	-179.20	-87.23
BOHC	48.10	332.86	178.32	107.43	92.35	264.28
OHCB	128.04	745.27	401.01	208.79	233.95	568.08
HCBO	126.10	676.67	440.79	166.16	307.83	573.74

Finally, we should end with some observations of limitations. The very small plot size raises concern about the true performance of each of the studied systems. The quality of performance of the mechanical tillage method in such a small plot is an open question. Also, the *field edge* impact may be different for various production systems and rotations, and may be large relative to the total area of the small plot.