Foreword

There have been many changes in turkey production, consumption, products and processing in the last 50 years. Members of the Iowa Turkey Federation (ITF) have had a front row seat for those changes since the organization was formed in 1948.

Iowa is a prime location for turkey production for a number of reasons. One is the fact that Iowa has three turkey processing plants.

In the year 2000, Iowa doesn't produce enough turkeys to keep those three processors running at capacity. About 7.5 million birds are raised annually in the state, and those processing plants could handle twice that many. Using two shifts, the plants run at about 60 percent of capacity by importing birds from surrounding states.

As the ITF entered its 50th year, the organization turned to Iowa State University with questions about the future of Iowa's turkey industry. A report was produced in December of 1998 that outlined the condition of the state's turkey production and processing industry and how it compares with other states.

At the request of The Futures Committee of ITF, and with funding from the Iowa Department of Economic Development and the Iowa Area Development Group, that first report has been updated.

Members of the Iowa State University economics department were joined by representatives of the animal science department and the ISU College of Veterinary Medicine to produce both reports.

A number of questions were considered in 1998 and again in 2000. Are there opportunities to expand the industry in Iowa? How do turkey marketing contracts work? What is the economic impact of the industry?

This publication includes five chapters filled with answers to many of the questions that face the Iowa turkey industry. A sixth chapter summarizes the ISU findings and outlines some possible opportunities.

The papers in this publication were authored by members of the Iowa State University faculty. They include:

C. Phillip Baumel, economics
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Darrell Trampel, veterinary medicine

The ISU Economics Department appreciates the efforts of Gretta Irwin, executive director of the Iowa Turkey Federation (ITF), the ITF Futures Committee, the Iowa Department of Economic Development, the Iowa Area Development Group and the support of the many other individuals who made this project possible.

Additional copies of this publication are available at no cost. To request a copy, write to C. Phillip Baumel, Iowa State University, 460B Heady Hall, Ames, IA 50011-1070. Or call 515-294-7318.

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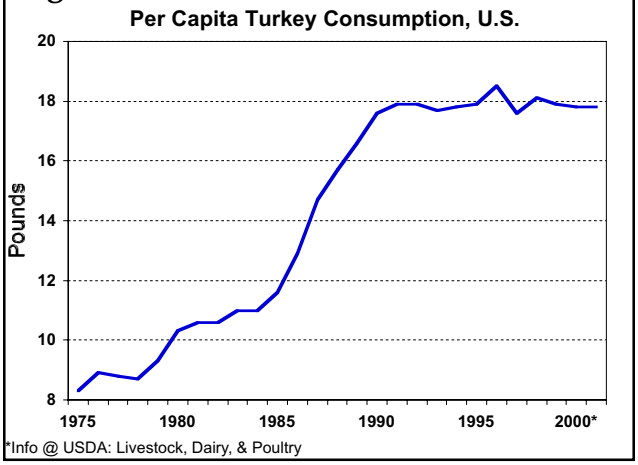
Chapter 1
THE U.S. AND IOWA TURKEY INDUSTRIES: SITUATION AND OUTLOOK

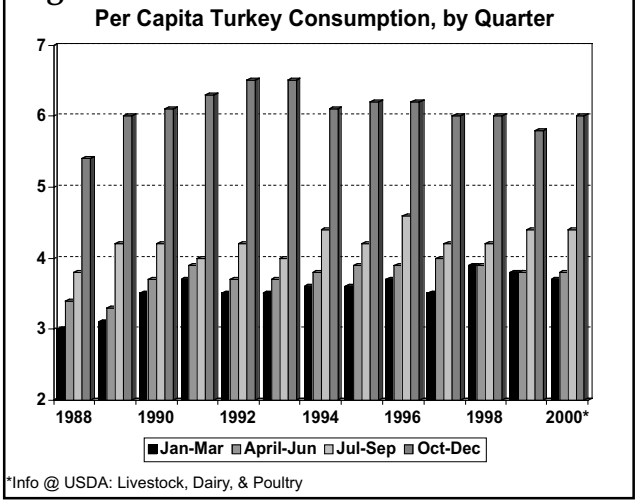
During the 1980s, both U.S. turkey production and consumption almost doubled. But since 1990, the growth in U.S. per capita consumption has leveled off or even declined. See Figures 1 and 2. The growth of the industry in the 1990s slowed with the economic returns. The industry lost money in six of the past 10 years and had average prices near costs for the decade. Returns in 1999 were the highest of the decade with the lowest costs in 20 years and the highest prices in 10 years.

Figure 1



*Info @ USDA: Livestock, Dairy, & Poultry

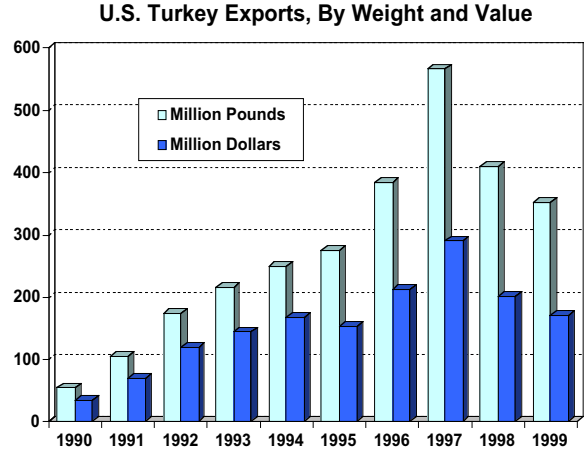
Figure 2



*Info @ USDA: Livestock, Dairy, & Poultry

For a while, production growth continued as the industry found export markets for the parts and products least in demand in the United States. See Figure 3. But since 1997, export growth stopped and declined to pre-1996 levels.

Figure 3

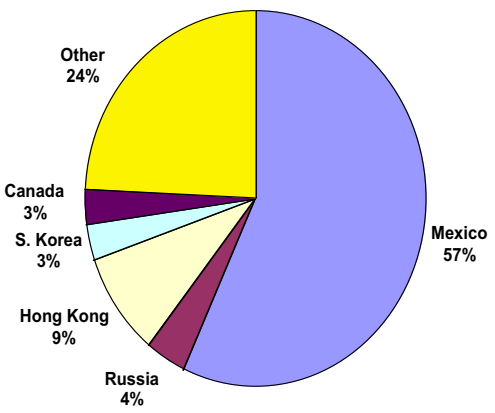


Potential for Growth

Future growth will depend on the ability of the industry to renew the growth in domestic consumption, or to find substantial new export markets. The United States has a glut of animal protein and U.S. consumers appear to have reached their consumption capacity. The cost of producing turkey is higher than the cost of producing a broiler. It will take enormously successful new turkey products to capture market share from either broiler meat or pork.

Export markets are dominated by Mexico. Exports to that country have grown 65 percent since 1995 and now represent 59 percent of U.S. exports. See Figure 4.

Figure 4



These are highly price sensitive markets which absorb 'by-products' such as thighs, drumsticks and mechanically-separated meat. These export markets will exist as long as inexpensive by-products are available. However, these export markets are unlikely to create the financial incentives required for further growth in turkey production.

This information suggests that the U.S. turkey industry has entered a mature phase with a possible over-abundance of buildings and processing capacity. Unless a major new source of demand develops, the U.S. turkey industry will continue to teeter on prices near breakeven if new production comes on line faster than demand grows. In the face of price pressure, the industry will tend to consolidate in an attempt to cut costs.

Industry Location

The U.S. turkey industry is relatively concentrated geographically. The top five states produce almost 60 percent of U.S. production. See Figure 5. The top 10 states account for 80 percent of total production.

Figure 6 shows what has happened to the market shares of the top three states over the past 10 years. North Carolina has seen its share fall from 21 to 17 percent, as growth occurred in Minnesota (from 14 to 16 percent), and to a lesser extent in Arkansas. The market share of all three states fell in 1998 as growth occurred in second-tier states such as Missouri and Virginia.

The decline in North Carolina is the result of production companies shifting from turkeys to broilers. The growth in Minnesota appears to have been due primarily to expansion of one processor.

Figure 5

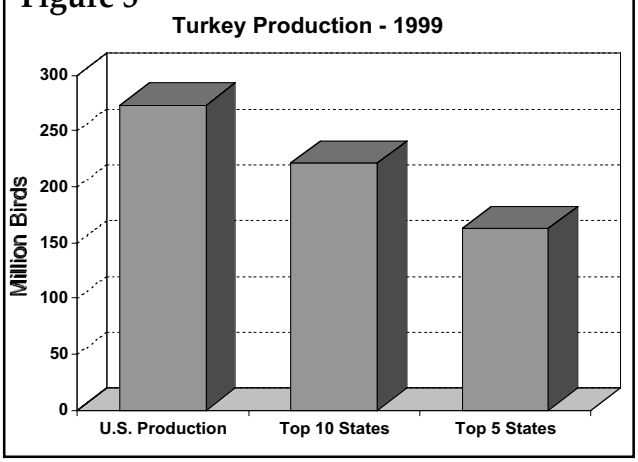
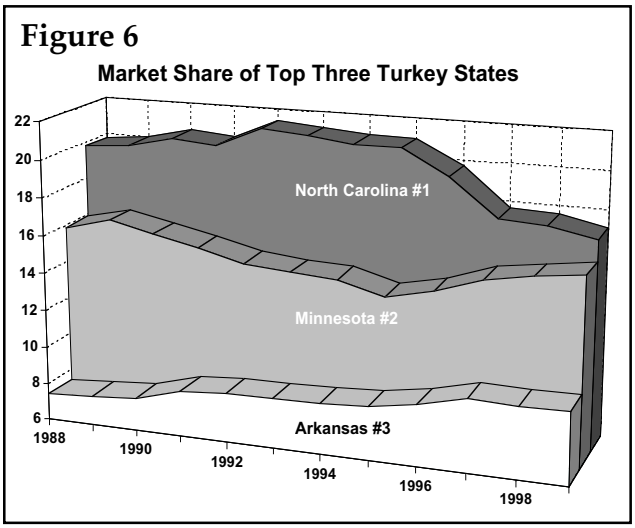


Figure 6



Iowa's Share of Production

Figure 7 compares 1989 and 1999 production levels for some selected states. Figure 8 compares Iowa's share with Minnesota and Missouri and Figure 9 shows Iowa's share of total U.S. production that declined since the mid 1970s, but rebounded in 1998 and 1999. There is no clear geographic pattern to U.S. turkey production. Iowa's share has fallen relative to Minnesota. Minnesota does have slightly less expensive feed costs than Iowa (see chapter 2), but both have substantially lower feed costs than North Carolina or Arkansas.

The early location and growth of the industry in North Carolina and Minnesota may be due to the existence of strong companies and individuals in these states who decided to grow turkeys near home. Now that the market is maturing, there seems to be a trend away from high cost states such as California and North Carolina, and a trend towards Minnesota and Missouri. This may mean feed costs are becoming a more significant factor.

It is possible that as cost pressure increases, more of the production will locate where feed costs are lowest. However, the industry will move very slowly. The absence of any major new markets will slow construction of new facilities, and older facilities will remain in production to cover fixed costs.

Figure 7

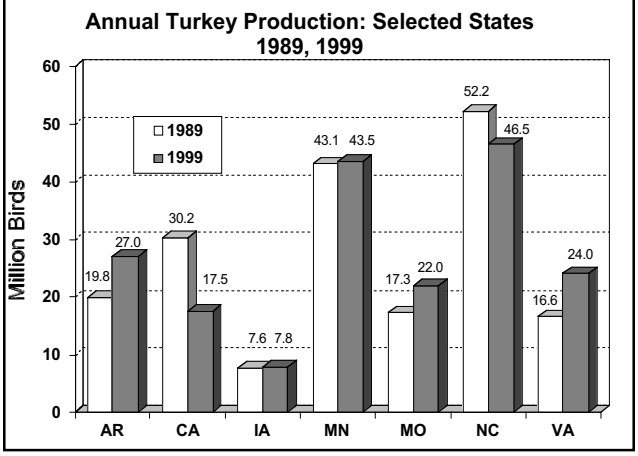


Figure 8

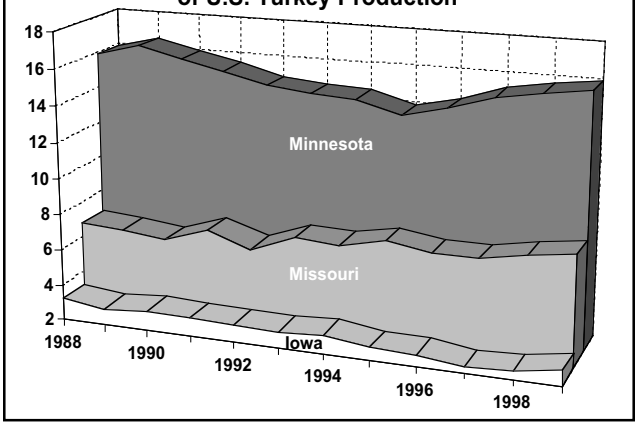
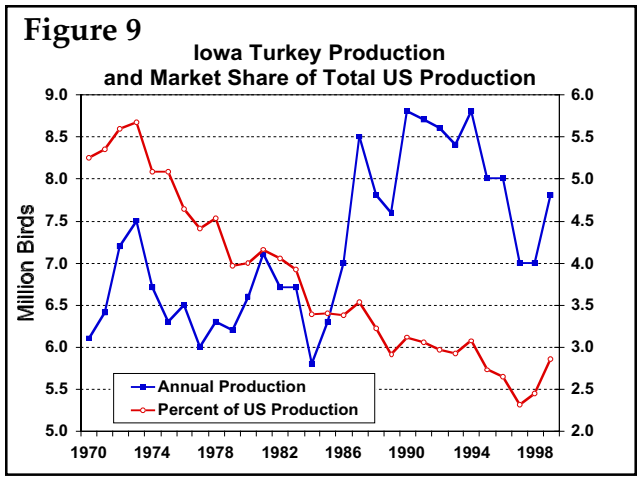


Figure 9



Prices and Profits

Figure 10 shows the annual average prices received by farmers in Iowa and the United States. The Iowa prices and the U.S. prices are quite close. Iowa prices were higher in 1996-1997, but were lower than U.S. prices in 1999. Monthly price data shows that market prices

Figure 10

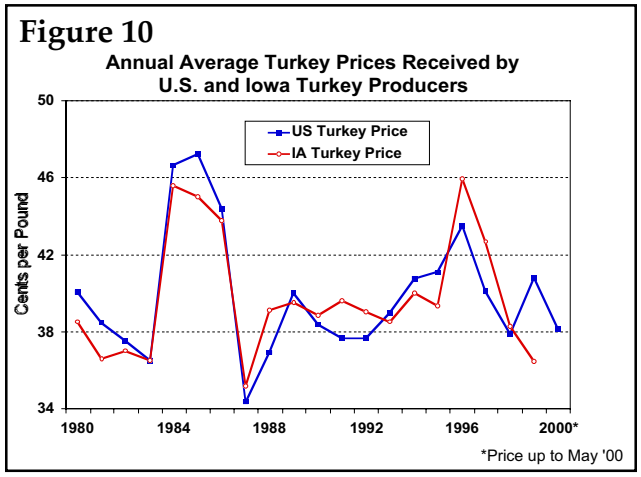
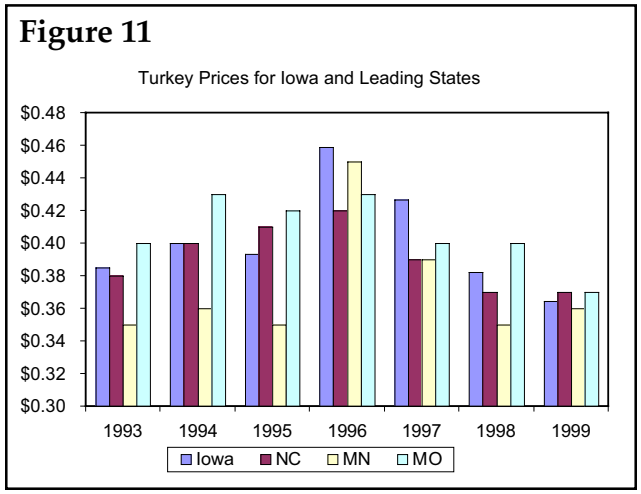


Figure 11



strengthened in the last half of 1998, which allowed the industry to return to profitability. However, it is clear from the long-term trend that prices seldom exceed 65 cents per pound for very long.

Iowa turkey prices have faired relatively well compared to other leading turkey states as shown in Figure 11 on page 7. Since 1993 Iowa prices have averaged below North Carolina in only two years (1995 and 1996) and have exceeded Minnesota every year. However, Missouri prices have averaged above Iowa in all but two years.

Tables 1 and 2, on page 9, compare production costs and wholesale prices for turkeys on a quarterly basis. Again, this information shows how competitive the industry is. Average production costs exceeded average prices in half of the last 20 years. In four of those 10 years, wholesale prices exceeded production costs. Average costs and prices were nearly identical in the 1990s.

Summary

The U.S. turkey industry has most likely entered a new phase where growth in production and consumption will be small. This means the industry will require very little new construction. Under this industry structure, increased attention must be paid to reducing costs and the industry will need to consolidate.

There is some evidence that economic conditions would favor the Corn Belt if additional growth was justified. Recent disease problems in the Southeast have encouraged some turkey production and processing to switch to broilers. However, without any major new market, the industry will be slow to relocate. With an industry as finely balanced between profits and losses as the turkey industry, any new production could create an oversupply and cause a return to a loss situation.

Table 1.
Costs of Turkey Production, Ready-to-Cook, at Wholesale, 1979-2000
(Cents per Pound, Ready-to-Cook)

Year	Quarter I	Quarter II	Quarter III	Quarter IV	Annual
1979	55.3	56.6	58.7	59.6	57.5
1980	60.2	59.3	58.8	65.3	60.9
1981	69.0	67.6	67.5	64.5	67.2
1982	59.8	60.9	61.4	58.3	60.1
1983	60.5	63.2	66.0	69.6	64.8
1984	70.4	68.0	68.5	64.7	67.9
1985	61.5	60.7	60.1	59.0	60.3
1986	59.6	60.6	61.1	58.0	59.8
1987	56.5	56.1	58.9	58.2	57.4
1988	60.8	60.9	65.1	69.2	64.0
1989	68.3	67.8	66.4	65.1	66.9
1990	62.3	61.5	63.6	62.8	62.6
1991	60.9	61.4	62.3	62.5	61.8
1992	62.4	62.9	63.2	61.0	62.4
1993	60.1	60.5	61.4	63.3	61.3
1994	64.1	65.1	63.7	60.3	63.3
1995	59.0	59.7	61.2	63.2	60.8
1996	67.5	71.2	77.1	74.8	72.7
1997	67.4	68.7	70.5	68.2	68.7
1998	66.2	63.5	60.8	58.0	62.1
1999	57.6	57.5	57.4	56.2	57.2
2000*	57.3	59.3			

* Quarter II, 2000 preliminary

Source: USDA

Table 2.
U.S. Wholesale Prices for Young Turkeys,
Weighted Averages for Three Regions, 1979-2000
(Cents per Pound, Ready-to-Cook)

Year	Quarter I	Quarter II	Quarter III	Quarter IV	Annual
1979	69.7	66.8	63.5	69.7	67.4
1980	60.1	55.8	67.9	74.4	64.6
1981	64.1	67.6	66.6	58.4	64.2
1982	55.1	58.7	66.0	63.6	60.9
1983	53.8	57.2	60.8	69.5	60.3
1984	67.5	67.8	74.2	88.1	74.4
1985	69.3	65.2	78.2	89.5	75.6
1986	60.8	71.5	83.1	76.6	73.0
1987	56.9	58.9	55.0	58.1	57.2
1988	47.7	50.9	72.4	71.7	60.7
1989	61.5	71.0	64.6	65.9	65.7
1990	55.4	61.4	66.7	65.8	62.4
1991	54.9	62.0	65.6	60.6	60.8
1992	56.2	60.1	61.4	64.2	60.5
1993	57.2	60.3	64.7	69.1	62.8
1994	59.4	63.3	68.0	71.5	65.5
1995	59.4	61.4	68.9	74.0	65.9
1996	64.5	65.8	67.4	69.0	66.7
1997	58.1	65.0	65.9	65.4	63.6
1998	55.0	57.9	64.5	71.2	62.2
1999	59.1	66.1	72.6	73.5	67.8
2000*	61.0	65.6			

* Quarter II, 2000 preliminary

Source: USDA

Chapter 2
COMPETITIVENESS OF THE IOWA TURKEY INDUSTRY

This chapter compares production costs of live turkeys for Iowa and the competing states of Minnesota, Missouri and North Carolina.

Determining accurate production costs is not an easy task for several reasons. Costs vary from day to day as input prices change. Turkey production systems in Iowa and Minnesota are different from the more integrated structure that exists in North Carolina. And economies of scale and the efficiency with which existing facilities are being operated are factors.

For example, the per pound fixed cost (overhead) associated with grinding feed depends on the number of tons processed. All of this, coupled with a natural reticence by those involved to provide access to accurate data, makes it very difficult to derive accurate and objective measures of production costs.

What can be done is to examine differences in input prices and then use these base costs in a sensitivity analysis. For example, it is known that Iowa has a feed cost advantage over North Carolina, but it is not known how much poults cost in North Carolina because the North Carolina industry maintains ownership through the production cycle. The purpose of this sensitivity analysis is to see if there is any realistic difference in poult prices that is large enough to offset Iowa's comparative advantage in feed.

Input Price Comparison

Table 1 compares costs of selected inputs in Iowa with costs in Minnesota, Missouri and North Carolina. These costs are derived from industry sources and USDA published data. Building costs are higher in Iowa and Minnesota because of the more severe climate. A case could be made that the Iowa structures, although more expensive, will last longer than those built in North Carolina. If this is true, then the North Carolina building cost advantage will be lower than what is shown here.

The figures in Table 1 suggest that Iowa and Minnesota have substantial feed price advantages over Missouri or North Carolina. The sensitivity analysis that comes later shows how changes in price levels would influence production costs. But as long as the cross-state differentials shown in Table 1 remain, changes in overall price levels have little impact on differences in production costs across states.

The corn and soybean meal price differences are based on local cash price quotes on open markets. Much of the corn and soybean meal fed in North Carolina is imported by rail directly by growers. The growers must achieve some cost savings to make this worthwhile, and to the extent that these transportation savings occur, the Iowa feed price advantages will not be as

Table 1. Cost Comparison of Selected Inputs

State	Corn Price ($/bu)	Soybean Meal Price ($/ton)	Propane Cost ($/gal)	Electricity (cents/ kw-hr)	Propane (gal/bird)	Feed Efficiency	Market Weight	Mortality and Condemnation (%)	Total Capital Investment	Total Cost per Pound Sold
Iowa	$1.97	$150	0.55	6.59	0.50	2.60	31.00	15.40%	$775,000	$0.343
Minnesota	$1.86	$140	0.56	6.12	0.55	2.60	31.00	15.40%	$775,000	$0.334
Missouri	$2.06	$150	0.55	5.53	0.45	2.65	33.80	13.50%	$675,000	$0.320
N. Carolina	$2.51	$185	0.69	6.34	0.20	2.59	31.10	12.60%	$575,000	$0.339

Sources: Feed and electric prices, USDA Agricultural Prices. Feed efficiency, weight and mortality and condemnation, *Poultry USA* , January, 2000. Propane use and price, and investment from industry sources.

large as those shown in Table 1. But the transportation advantage cannot be very large, because if it were, it would allow the importer to undercut local markets and drive down cash prices in North Carolina.

Sensitivity Analysis

Table 2 shows the production costs per pound for tom turkeys in Iowa under a range of different input prices. Tables 3 through 5 show the same information for North Carolina, Missouri and Minnesota. Using the input costs shown in Table 1, the total cost is 34.3 cents per pound in Iowa and 33.9 cents per pound in North Carolina.

If the Iowa feed costs (relative to North Carolina) are higher than those shown in Table 1, Table 2 can be used to find the new total production cost. If Iowa prices were comparable to North Carolina prices, for example $2.40/bushel for corn and $200/ton for soybean meal, production cost would rise to 37.5 cents per pound. This suggests that Iowa has a 2-to-4 cents per pound cost advantage over North Carolina, with the larger advantage occurring in north-central and northwest Iowa where corn is cheaper.

Missouri has lower costs than Iowa due to lower non-feed expenses and initial investment costs and heavier market weights. Minnesota's lower feed costs results in lower total cost of production. Iowa's costs are the highest of the four states. However, this comparison assumes that each industry operates at the same level of technical efficiency. It's said that poult and other milling costs are much lower in North Carolina because of the vertical integration and economies of scale that exist there. It is interesting to ask whether these lower costs would offset Iowa's feed cost advantage.

Using the informal information collected for this report, poult prices in North Carolina are $1.20 instead of $1.45. In this case, the total costs in North Carolina fall by almost 1 cent per pound. Assume that other feed costs (e.g., mill overhead) equal $40 instead of the $57.65 used in Iowa. Then the production cost in North Carolina falls by an additional 3.5 cents.

Table 2. Iowa Sensitivity Table

Total Cost in Cents per Live Weight Pound Sold - Tom Budget

Soybean Meal Price ($)	Corn Price ($)					
	1.80	**2.00**	2.20	2.40	2.60	2.80
125	32.80	33.50	34.20	34.90	35.60	36.30
150	33.70	34.40	35.10	35.80	36.50	37.20
175	34.50	35.20	35.90	36.60	37.30	38.00
200	35.40	36.10	36.80	37.50	38.20	38.90
225	36.30	37.00	37.70	38.40	39.10	39.80

Feed Efficiency						
2.30	2.40	2.50	**2.60**	2.70	2.80	2.90
31.84	32.65	33.46	34.26	35.07	35.88	36.69

Other Variable Costs ($)*						
100,000	120,000	140,000	**160,000**	180,000	200,000	220,000
32.45	32.97	33.49	34.01	34.53	35.05	35.57

Poult Price ($)						
0.70	0.95	1.20	**1.45**	1.70	1.95	2.20
31.41	32.36	33.31	34.26	35.22	36.17	37.12

Other Feed Costs ($)**						
30.00	40.00	50.00	**57.65**	70.00	80.00	90.00
30.02	31.55	33.09	34.26	36.16	37.70	39.23

* Other variable costs include propane, electricity, litter removal, mortality pick up, repairs and maintenance, and labor.

** Other feed costs include other ingredients, blended fat, and grind and mix.

Note: Bold numbers represent typical values for each variable in Iowa.

The best guess is that North Carolina does have a 25 cent poult cost advantage and a $17 per ton feed manufacturing advantage. This means that Iowa's feed cost advantage is offset, and probably exceeded by North Carolina's advantage in poults and in feed manufacturing. Note that Iowa's feed advantage is real and long-term, whereas North Carolina's advantages are temporary and due to industry structure.

In other words, Iowa can capture the advantages of North Carolina by adapting North Carolina production practices and industry structure, but North Carolina can never reduce its costs of feed relative to Iowa. If there were room for a substantial expansion in the U.S. turkey industry, and if this were to occur in Iowa, then Iowa could achieve the economies of scale and industry structure advantage of North Carolina.

The data in Tables 1 through 5 do not include South Dakota. Much of the production in South Dakota is produced by colonies of Hutterites. These colonies pay less for labor than producers in Iowa. Moreover, it is not clear the same budgeting procedures are used. It is known, though, that feed costs in southeastern South Dakota are lower than in Iowa. Provided the labor cost advantage mentioned earlier, it is almost certain that South Dakota has a small advantage over Iowa. This is particularly true if the costs of using new facilities in Iowa are compared with the older, and therefore more depreciated, buildings in South Dakota.

Conclusions

Access to inexpensive corn and soybean meal gives the Iowa turkey grower a 2 to 4 cents per pound cost advantage over the competition in North Carolina. However, there is evidence to suggest that growers in North Carolina have found ways to offset this disadvantage by using larger, more efficient mills and by growing their own poults. Iowa could offset the North Carolina advantages by increasing the size of the industry and by changing the industry structure. However, this would require construction of new barns in Iowa, which can only be justified at a slow rate of growth given the current market situation and Iowa's cost disadvantage with South Dakota.

Table 3. North Carolina Sensitivity Table

Total Cost in Cents per Live Weight Pound Sold - Tom Budget

Soybean Meal Price ($)	Corn Price ($)					
	1.80	2.00	2.20	2.40	**2.60**	2.80
125	29.49	30.16	30.84	31.51	32.19	32.86
150	30.33	31.00	31.68	32.35	33.03	33.70
175	31.17	31.85	32.52	33.20	33.87	34.55
200	32.01	32.69	33.36	34.04	34.71	35.39
225	32.86	33.53	34.21	34.88	35.56	36.23
Feed Efficiency						
2.30	2.40	2.50	**2.60**	2.70	2.80	2.90
31.30	32.20	33.10	33.99	34.89	35.79	36.69
Other Variable Costs ($)*						
100,000	**120,000**	140,000	160,000	180,000	200,000	220,000
33.44	33.95	34.45	34.95	35.46	35.96	36.46
Poult Price ($)						
0.70	0.95	1.20	**1.45**	1.70	1.95	2.20
31.14	32.06	32.98	33.90	34.82	35.74	36.66
Other Feed Costs ($)**						
30.00	40.00	50.00	**57.65**	70.00	80.00	90.00
29.81	31.29	32.77	33.90	35.73	37.21	38.70

* Other variable costs include propane, electricity, litter removal, mortality pick up, repairs and maintenance, and labor.

** Other feed costs include other ingredients, blended fat, and grind and mix.

Note: Bold numbers represent typical values for each variable in North Carolina.

Table 4. Missouri Sensitivity Table

Total Cost in Cents per Live Weight Pound Sold - Tom Budget

Soybean Meal Price ($)	Corn Price ($)					
	1.80	**2.00**	2.20	2.40	2.60	2.80
125	30.21	30.90	31.60	32.30	33.00	33.70
150	31.08	31.78	32.47	33.17	33.87	34.57
175	31.95	32.65	33.34	34.04	34.74	35.44
200	32.82	33.52	34.21	34.91	35.61	36.31
225	33.69	34.39	35.09	35.78	36.48	37.18

Feed Efficiency						
2.30	2.40	2.50	2.60	**2.70**	2.80	2.90
29.18	29.98	30.78	31.58	32.39	33.19	33.99

Other Variable Costs ($)*						
100,000	120,000	**140,000**	160,000	180,000	200,000	220,000
31.06	31.52	31.99	32.46	32.93	33.39	33.86

Poult Price ($)						
0.70	0.95	1.20	**1.45**	1.70	1.95	2.20
29.42	30.28	31.13	31.98	32.84	33.69	34.55

Other Feed Costs ($)**						
30.00	40.00	50.00	**57.65**	70.00	80.00	90.00
27.75	29.28	30.81	31.98	33.88	35.41	36.94

* Other variable costs include propane, electricity, litter removal, mortality pick up, repairs and maintenance, and labor.
** Other feed costs include other ingredients, blended fat, and grind and mix.
Note: Bold numbers represent typical values for each variable in Missouri.

Table 5. Minnesota Sensitivity Table

Total Cost in Cents per Live Weight Pound Sold - Tom Budget

Soybean Meal Price ($)	Corn Price ($)					
	1.80	2.00	2.20	2.40	2.60	2.80
125	32.67	33.37	34.07	34.77	35.47	36.17
150	33.55	34.25	34.95	35.65	36.35	37.05
175	34.42	35.12	35.82	36.52	37.22	37.92
200	35.29	35.99	36.69	37.39	38.09	38.79
225	36.17	36.87	37.57	38.27	38.97	39.67

Feed Efficiency						
2.30	2.40	2.50	2.60	2.70	2.80	2.90
31.07	31.85	32.63	33.41	34.19	34.96	35.74

Other Variable Costs ($)*						
100,000	120,000	140,000	160,000	**180,000**	200,000	220,000
31.58	32.10	32.62	33.14	33.66	34.18	34.70

Poult Price ($)						
0.70	0.95	1.20	**1.45**	1.70	1.95	2.20
30.55	31.50	32.46	33.41	34.36	35.31	36.26

Other Feed Costs ($)**						
30.00	40.00	50.00	**57.65**	70.00	80.00	90.00
29.16	30.70	32.23	33.41	35.30	36.84	38.37

* Other variable costs include propane, electricity, litter removal, mortality pick up, repairs and maintenance, and labor.
** Other feed costs include other ingredients, blended fat, and grind and mix.
Note: Bold numbers represent typical values for each variable in Minnesota.

Chapter 3
CHARACTERISTICS OF TURKEY MARKETING CONTRACTS

Turkey production occurs in four ways: processor–owned farms, contract growers, independent producers, or closed cooperatives.

- Company-owned farms are owned by the procesor and managed by company employees. All production costs are the responsibility of the processor. Production and market risk are assumed by the processor.
- Contract growers own their turkey growing facilities. Production costs are the responsibility of the processor. The turkey producer is compensated by the processor for the use of the growing facilities and the labor required to produce the turkeys. Production and market risk are assumed by the processor.
- Independent growers usually own the turkey growing facilities. Production costs are the responsibility of the turkey producer. Production risk is assumed by the producer and the market risk can be totally assumed by the producer or shared with the processr.
- Closed cooperative growers usually own the turkey growing facilities. Production costs are the responsibility of the turkey producer. Production risk is assumed by the turkey producer but market risk is shared among the cooperative members as each producer is given the opportunity to purchase delivery rights at the cooperative-owned processing facility.

Independent producers sign a marketing contract with the processor before the poults are placed to assure a market for the finished birds. However, the producer is responsible for all production costs and risks, and depending on the contract, they can assume all or part of the market risk. The producer benefits from having a known outlet for the birds and a known procedure for establishing the price of the birds at delivery. The processor benefits from a scheduled supply of birds coming to the plant. Closed cooperatives may be structured in a variety of ways, but typically share the marketing risk across producer members.

Iowa processors can maintain or expand their business through importing birds from neighboring states or by increasing company-owned production. However, a key to sustainability and growth of turkey production in Iowa is the relationship between producers and processors and the marketing contracts that formally link these two sectors. Independent producers interviewed for this report recognized the need for Iowa processors to remain competitive in a national and international markets, but they have concerns about the terms of marketing contracts and their relative bargaining power. While acknowledging these concerns, processors must weigh the long run competitive impact of each contract change.

One concern is that current marketing contracts for delivery to a turkey processor are typically for a short duration, such as 12 months. These short-term contracts are primarily for producers who have their facilities paid for and little or no out-of-pocket facility expense. Processors trying to encourage investment in facilities may need to offer longer-term contracts that provide the producer, and the producer's lender, some assurance that the investment will cash flow at least until loans are paid off in order to encourage investment or reinvestment in production facilities.

Producers also raised concern about which variables are used in calculating production expenses and/or payment price. Improved communication between processors and producers may improve understanding and working relationships between the two parties. The resulting contract must adequately address concerns of both processors and producers if Iowa is to grow its turkey industry.

Turkey Contract Provisions

The turkey marketing contracts reviewed for this study were quite lengthy and complex and provided ample discretion to the processor. There are two basic contracts, one for hens and one for toms. The difference is due primarily to the final weight and efficiency differences between the sexes. There also may be payment adjustments tied to the month the birds are processed to reflect the expected difference in efficiency across seasons.

The producer is responsible for loading equipment and labor. Processors pay the cost of transportation. The producer also stands the loss during transportation due to death and condemnation. The producer must make deliveries conform to the processors' schedule, but the processor may change the delivery schedule up to and including the scheduled day of delivery at no cost to the processor. There may be discounts to the base price if the flock is either under or over the ideal weight range (impacted by delivery date) and for failing to have enough birds in the Grade A category. The contracts may require the producer be responsible for government inspection cost if "user fees" are charged to the processor.

Pricing procedures for the birds differ across contracts, but two examples reviewed incorporated an estimated cost of producing the turkey as a base price compared to the Urner-Barry reported market price. Urner-Barry is a private price reporting service. The base price is determined by the calculated cost of producing the bird by the producer as spelled out in the contract. The market value of the bird is based on the Urner-Barry reported wholesale price less the processing and freight cost of the processor. The Urner-Barry price represents the wholesale price of turkeys. The processing and freight charge deducted from the Urner-Barry price is determined by the individual processor.

One contract guaranteed the cost-derived base price as a minimum and split the difference between the base and the Urner-Barry adjusted price equally between the processor and producer. The other contract split the difference between the Urner-Barry adjusted prices above and below the base price with a guaranteed lower price level to the producer.

The base price calculation is a complicated formula that incorporates the costs of raising the turkeys. It is based on an allotted amount of corn and soybean meal per bird and other feed costs, a seasonally adjusted "other growing costs," poult costs and a heating adjustment cost. The source of prices to be included in the calculation are specified, but often are not prices that can be monitored easily. The "other growing expenses" is not specified, but is likely an allocation for electrical costs, veterinary and medicine expenses, and other miscellaneous costs. Payments for overhead such as facility cost and labor may or may not be accounted for directly. The producer may be putting these expenses at risk and the returns to these overhead expenses comes from market value being higher than the base price.

Turkey vs. Hog Contracts

The typical Iowa independent turkey producer owns the buildings and equipment and provides labor, feed and operating inputs to grow turkeys to processing weight. The producer buys poults and schedules them to match a delivery date at the processing plant. The poults must be of acceptable genetics and the nutrition and health program must conform to best management practices. The price determined in the contract is typically tied to the Urner-Barry price report, and also may incorporate the cost of feeding birds in the pricing formula.

Contrasting the duration and terms of turkey contracts with those offered in the pork industry highlights some differences. Short-term marketing contracts for one group of hogs are guaranteed price contracts tied to the futures market. Marketing contracts longer than one group of hogs are typically three to 10 years in length and are priced relative to the spot market or on a cost-plus basis off of grain prices.

Payment for hogs must be made within 24 hours after determining the value of the animal. The turkey processors in the contracts examined had up to 14 days to pay the producer. If hog contracts incorporate cost-of-production, they use

an easily observable grain market like a one-day-a-week Omaha river bid for corn and Decatur, IL soybean meal prices. Some turkey contracts do not clearly identify which elevator bid prices will be used to set the contract price, or the prices may not be readily accessible to the producer.

Summary

Turkeys produced by independent producers and contract growers are typically marketed under short-term contracts although generally these contracts are renewed regularly so producers and processors have a long-term relationship. These contracts are very complex and specify standards and pricing procedures that will be used in valuing the turkeys. In general, the processor maintains a great deal of control over scheduling of the birds and in monitoring the variables in the pricing formulas. Producers appear to stand the risk of condemnation above levels allowed by the contract, and are partially at risk for birds that are not of acceptable quality when inspected.

The pricing procedures used to value turkeys in the two contracts examined incorporate a cost-of-production and market price reported by a private firm. The cost-of-production figure is a calculated value standardized across all producers which includes variable costs such as feed costs and overhead costs that vary seasonally.

Compared with the pork industry, turkey-marketing contracts are for a shorter time period, do not require prompt payment and are more complicated. Hog marketing contracts are often three to 10 years in length or are "evergreen," which means the contract continues until one party cancels it with sufficient warning.

Chapter 4
TURKEY PROCESSING IN IOWA

In 1989, the Land O' Lakes processing plant in Ellsworth ceased operations. Since then, Iowa has had three turkey processing plants. Here is a profile of each of the three plants.

Bil-Mar Foods in Storm Lake is owned by Sara Lee Foods. The plant processes only tom turkeys and does not sell whole turkeys. In 1999, Bil-Mar Foods processed 7.7 million turkeys.

Iowa Turkey Products (ITP) in Postville is owned by independent shareholders. "Turkey Valley Farms" is the brand name of products from ITP. The plant processes a mix of hen and tom turkeys and much of the product is shipped out of Iowa. The ITP plant output consists of whole birds, tray pack and uncooked further processed products. In 1999, Iowa Turkey Products processed 4.5 million turkeys.

West Liberty Foods in West Liberty was owned by the Louis Rich Company before being sold to the Iowa Turkey Growers Cooperative in 1996. The cooperative owns the plant and the turkeys during production. West Liberty Foods is still packaging for Louis Rich Company and other further process manufacturers. The company also sells turkey products under the brand "West Liberty Foods." In 1999, West Liberty Foods processed 4.5 million turkeys.

The Iowa Turkey Grower's Cooperative is a value added closed cooperative (VACC) organized under Chapter 501 of the Iowa Code enacted in 1996. Producer members buy delivery rights for all or a portion of the turkeys they produce and thereby capitalize the plant. Ownership of delivery rights carries with it the legal obligation that those rights be exercised by delivering turkeys to the plant. Once issued, delivery rights are tradable among eligible cooperative members. The traded price may vary above or below the par value price paid by the initial holder in response to economic forces. About four million birds are currently delivered under VACC delivery rights and the remaining birds processed at West Liberty Foods are purchased on the open market.

The VACC carries advantages for both growers and the processing plant. The plant can adjust the quantity of delivery rights issued to optimize output levels and gain operational efficiency. The grower has an assured market once the rights have been purchased. The quantity of delivery rights in circulation may be expanded to meet increased demand and plant capacity.

Periodically, existing members are given the opportunity to purchase additional delivery rights. On one occasion, the cooperative was opened for the addition of new members and delivery rights were issued to non-members who wished to join. The VACC has played an important role in keeping the plant operating efficiently and competitively and will likely continue to do so.

Source of Turkeys

In 1999, Iowa turkey plants processed more than 16.7 million turkeys. About 7.8 million of those were produced in Iowa, with the other 8.9 million originating from adjacent states. Iowa turkey processors have found that contracting with turkey producers in adjacent states who already have turkey production facilities is more economical than building new buildings for turkey production within this state. In general, turkey production facilities within a 200-mile radius of a plant are acceptable. Sources of out-of-state turkeys include:

- *Minnesota*. Minnesota supplies more turkeys to Iowa plants than any other state. A significant number of turkey producers in Minnesota are interested in producing turkeys for Iowa processing plants. Typically, these producers have older buildings and no longer have a contract with a Minnesota turkey processor. Turkeys from Minnesota are processed in all three of the Iowa plants.

Table 1. Turkeys Processed in Iowa at Current Shift Levels

Plant	No. Shifts/Day	Capacity/8-hour Shift (million)	Current Capacity	Current Plant Output (million)	Current Unused Capacity (million)
Iowa Turkey Products	1	4.7	4.7	4.5	0.2
West Liberty	1	5.0	5.0	4.5	0.5
Bil-Mar	2	4.1	8.2	7.7	0.5
Total	4	13.8	17.9	16.7	1.2

Table 2. Potential for Turkeys Processed if Shifts are Added

Plant	No. Shifts/Day	Capacity/8-hour Shift (million)	Current Capacity	Current Plant Output (million)	Current Unused Capacity (million)
Iowa Turkey Products	2	4.7	9.4	4.5	4.9
West Liberty	2	5.0	10.0	4.5	5.5
Bil-Mar	2	4.1	8.2	7.7	0.5
Total	6	13.8	27.6	16.7	10.9

- *South Dakota*. The Hutterite colonies in South Dakota provide turkeys for the Bil-Mar Plant in Storm Lake. South Dakota ranks second behind Minnesota as an out-of-state source of turkeys processed in Iowa.
- *Missouri*. Missouri growers, who are in a situation similar to the Minnesota growers described earlier, supply turkeys to all three Iowa turkey processing plants.
- *Wisconsin and Illinois*. Wisconsin and Illinois supply relatively few turkeys for Iowa plants, but both states ship some birds into the state.

Capacity of Iowa Turkey Processing Plants

Current Processing Capacity. Iowa Turkey Products and West Liberty Foods operate a single 8-hour shift per day. Bil-Mar operates two, 8-hour shifts. Currently, these three plants process 16.7 million turkeys each year. If all three Iowa turkey plants were operating at full capacity for each 8-hour shift, 17.9 million tom turkeys per year could be processed. The number of turkeys processed annually by each plant under the current system is shown in Table 1.

Potential Processing Capacity. Table 2 shows that adding a second 8-hour shift each day at Iowa Turkey Products and West Liberty Foods would significantly increase turkey processing capacity in Iowa. The assumption is made that a second 8-hour shift would process the same number of turkeys as the first shift. If all plants operated with two shifts, Iowa could process up to 27.6 million turkeys each year.

If all existing plants operated at capacity with two shifts, an additional 10.9 million turkeys could be processed annually in Iowa. In 1999, one turkey plant operating at capacity with two shifts could have processed the 7.8 million turkeys grown in Iowa.

How Iowa Plants Compare

All three Iowa plants are considered to be average or above average in terms of plant equipment and technology when compared to industry standards on a nationwide basis. Two plants are in older buildings but this does not appear to be a hindrance to efficient operation. Table 3, on page 21, outlines several processing steps, and how Iowa's plants score in each area.

Table 3. Iowa Turkey Processing Plants

Processing Step	Plant A	Plant B	Plant C
Slaughter	+	0	0
Scalding	0	0	0
Defeathering	0	0	0
Evisceration	+	+	0
Chilling	+	0	0
Deboning	+	0	0
Grinding & Mixing	+	0	0
Refrigeration	0	0	0
Packaging	0	0	0
Further Processing	+	0	0
Cold Storage Capacity	0	-	0
Plant as a Whole	+	0	0

Each processing step in each plant is ranked as:

Below Average	(-)
Average	0
Above Average	(+)

Challenges to Expansion

Limited Availability of Labor. Lack of available labor is a major impediment to reaching capacity for a single shift or to expanding capacity by operating a second shift. At this time, the labor force in Iowa turkey plants is culturally diverse. Ethnic backgrounds of current workers include Russia, Southeast Asia, Latin America, Africa and the United States.

Limited Availability of Turkeys. In recent years, low turkey prices has reduced profitability to negative levels for growers and processors. As a result, the number of Iowa turkey producers has declined. Some producers have retired from livestock production and others have converted their turkey facilities to swine.

Inspection Issues. Iowa processors firmly believe that USDA inspection of turkeys is significantly more demanding in Midwest turkey plants than in similar plants located in the Southeast or West. Increased rates of condemnation result in line stoppage and empty shackles in the plants. A condemnation rate of 2 percent or less is desirable but condemnations at 4 percent or above reduces profitability for both processors and growers.

Limited Volume per Plant. The ability to provide turkey products in large quantities is helpful in securing and maintaining a share of the market. Vendors seek suppliers with operations that are large enough to fill the vendor's market needs.

Opportunities

Alignment with Other Processors. There may be opportunities for increased profitability through cooperation between processing plants. One obvious efficiency, which is already being implemented, is for Iowa Turkey Products to package and label whole turkeys for other plants lacking this capability. In a similar manner, plants could specialize in producing a particular further processed product and contract to produce that product for another plant which has its own specialty products to offer. Also, plants may be able to reduce costs of raw materials through cooperative purchasing and reduce transportation costs by cooperative arrangements.

Alignment with Commodity Cooperatives. It may be advantageous for processors to contract for turkey production with farmer-owned commodity cooperatives. Commodity cooperatives would require their members to deliver a speci-

fied quantity of corn or a specified combination of corn and soybeans to the cooperative. A cooperative would feed the grain to turkeys and deliver the turkeys at a price specified in the contract to a turkey plant for processing. Commodity cooperatives would enjoy certain tax advantages offered by Iowa's new 501 cooperative law.

Diversification. Plants that process meat from turkeys and another meat-producing species may experience less market risk than plants processing turkey meat alone. Markets for different meats do not always rise and fall together. Availability of meat from more than one species within the same plant provides an opportunity for development of new and unique further processed products using meat from both species.

Chapter 5
EMPLOYMENT AND INCOME EFFECTS OF TURKEY PRODUCTION IN IOWA

This chapter examines the statewide economic impacts of turkey production on Iowa employment and income. This information updates previous work done in a 1996 Iowa State University Economics Department Staff Paper, *Economic Importance of the Iowa Poultry Industry*, and a 1998 Agriculture and Home Economics Experiment Station report, *Iowa's Turkey Industry - An Economic Review*. Additional information was obtained from the Iowa Department of Workforce Development and the U.S. Bureau of Economic Analysis.

In 1999, Iowa farmers produced approximately 7.8 million turkeys. This was up from 7 million birds in 1998, but below nearly 9 million birds produced annually in the early 1990s.

None of Iowa's three turkey processing plants is fully utilized. Two operate with one 8-hour shift per day, and one works two shifts per day. Within the current shift schedule, these plants have the capacity to process 17.9 million turkeys per year. Running two shifts per day at all three plants would provide a processing capacity of 27.6 million birds per year.

In 1999, nearly 8.9 million turkeys came into Iowa processing plants from outside the state. This resulted in a total kill of 16.7 million turkeys, and brought the Iowa processing plants near the capacity of the current shift schedule. Within the current shift structure, Iowa processing plants have an excess capacity of 1.2 million birds per year before additional shifts need to be added or significant acceleration of processing needs to be implemented.

This study examined employment and wage impacts from increasing on-farm turkey production in the state by 1 million birds (to 8.8 million annually) and by 2.2 million (to 10 million annually). It is assumed that the importation of live turkeys for processing in Iowa's plants remains constant in these scenarios. This results in total kills of 17.7 million and 18.9 million birds annually. The lower of these totals would approach the normal operating capacity of the three existing processing plants within the current shift structure. The larger total would slightly exceed this capacity, but it is unlikely that it would result in additional full shifts. The extension of shifts through overtime or acceleration of processing are more likely at this level.

These are relatively large jumps in on-farm turkey production within the short term, but could be sustained by the processing system and are reasonable given past production in Iowa. Assuming out-of-state production sources continued to participate at the current rate, Iowa production would probably need to increase by at least 35-50 percent to add production shifts at the existing plants. This would significantly increase the employment impacts of production.

Turkey production in Iowa consumes a considerable level of inputs. Table 1 shows input needs for corn, soybean meal, veterinary supplies, utilities and miscellaneous costs for current and

Table 1. Selected Inputs for Selected Turkey Production Levels

	On-farm Turkey Production (millions of birds)		
Inputs	7.800	8.800	10.000
Corn (mil. bushels)	7.072	7.979	9.067
Soybean meal (mil. bushels)	2.704	3.051	3.467
*Total feed grain cost ($mil.)	50.440	56.907	64.667
Veterinary supplies ($mil.)	2.496	2.816	3.200
Utilities ($mil.)	11.336	12.789	14.533

*Feed grain bill based on long-run average prices of $2.50/bu. corn and $5.50/soybeans.

projected levels of turkey production.

Table 2 shows the estimated employment and income effects of turkey production at current and projected levels. Total estimated employment related to turkey production and processing in Iowa is currently 5,454 jobs with an associated income of $126.294 million annually. A production increase of one million birds would bring the estimated totals to 5,863 jobs and $136.416 million of income. An increase in production to 10 million birds would give estimates of 6,431 jobs and $150.457 million in associated income.

Table 2 does not include impacts associated with any increase in agricultural service due to expanding Iowa turkey production. These would include veterinary services, accounting and farm management services. There currently is one full-time equivalent veterinarian (spread over three practices) serving turkey production in Iowa. Additional turkey production will be expected to increase this proportionately. Additionally, the expansion examined here could be expected to generate one-half to one full-time equivalent worker in financial and managerial service at the farm level.

These estimates are highly dependent upon several conditions. First, the estimates are limited by the existence of unused capacity in the state. The turkey population increases will not require the addition of physical processing capacity. The proposed production increases will begin to push the current operating shift structure of Iowa processors, resulting in additional overtime or part-time employment in the existing plants. It also is assumed that producers will expand production primarily through the utilization of existing facilities. This reflects early 1990s production of 9 million birds in Iowa.

Larger impacts would be realized at the point where additional processing shifts and production facilities are necessary. The scenarios considered here very nearly maximize current operating shifts at Iowa processors. Additional increases in the number of turkeys processed will have increasing economic impacts until an additional processing shift is added. For this reason, it is important to the industry that birds sourced from out-of-state not be looked at as substitutes that are abandoned as in-state production increases. Processor abandonment of out-of-state production will delay shift expansion and limit the total impacts of in-state expansion. It is also important to keep in mind that turkey production takes place in a global meat industry. Any expansion of Iowa turkey production competes with other meats and producers in other regions for market shares.

It should be noted that, while these employment and income effects are associated with current and projected turkey production and processing, this is not an indication the entire effect is dependent upon turkey production.

The primary example of this is the impact of the "Rest of Agriculture" in Table 2. An increase or decrease in turkey production will use measurably larger or smaller amounts of feed grains

Table 2. Employment and income estimates for selected turkey production levels

Turkeys Processed (millions)	**16.4**		**17.4**		**18.6**	
On-farm Production (millions)	**7.8**		**8.8**		**10.0**	
Industry	Jobs	*Income	Jobs	*Income	Jobs	*Income
Turkey Production	307.400	4.591	311.100	4.645	320.900	4.792
Rest of Agriculture	224.700	3.355	226.000	3.375	229.600	3.428
Construction	103.200	3.215	110.100	3.430	129.300	4.029
Manufacturing	2048.800	52.426	2355.700	60.279	2770.400	70.891
Trans. Comm. & Util.	205.600	7.471	213.800	7.768	224.600	8.161
Trade	1058.300	20.010	1096.800	20.738	1148.200	21.709
Fin. Ins. & Real Est.	280.000	8.280	281.300	8.317	282.700	8.361
Service	1163.000	24.954	1205.400	25.862	1261.800	27.073
Government	63.200	1.993	63.500	2.002	63.800	2.013
Totals	5454.200	126.294	5863.500	136.416	6431.300	150.457

*All income figures are in millions of dollars.

but would not be expected to materially affect overall feed-grain production or prices within the state. Most of the affected feed-grain stocks would be transferred into the market at large, and to the extent that this transfer affected prices, the burden would be shared by the entire market with only fractional effects on Iowa. In addition, a portion of transportation and other effects allocated to turkey production and processing would be reallocated rather than disappear in the absence of these activities.

The estimates presented here are based on specified production relationships among the required inputs for a wide variety of goods and services. The model was used to look at the necessary inputs and labor requirements for increased turkey production and processing in Iowa. This information was matched with a vector of current local income information to develop the income effects throughout the major industries in the state. Because no assumptions have been made with regard to output prices for this analysis, there is no estimate of total industrial output, value added in the process, or capital accumulation.

Chapter 6
SUMMARY AND RECOMMENDATIONS

The first five chapters of this publication outlined current conditions in the turkey industry. This chapter summarizes those conditions, and makes recommendations for the future of the Iowa turkey industry.

Production and Processing

Under current market conditions, the United States has over-capacity in turkey production, production buildings and processing plants.

During the last decade, the U.S. turkey industry has been unprofitable in more years than it has been profitable. The average annual cost of production exceeded the average annual wholesale price of turkeys in 10 of the past 20 years. In two of the 10 years when average wholesale prices exceeded the average cost of production, prices exceeded cost of production by less than one cent per pound.

Iowa has a feed cost advantage over producers in the southeast and western parts of the United States. However, Iowa is at a slight net cost disadvantage because of its small scale of production and its inability to capture cost savings enjoyed by integrated producers.

Factors that favor the upper Midwest as a location for new turkey buildings are a permanent feed cost advantage, the recent emergence of a labor cost advantage in favor of the upper Midwest and the emergence of environmental barriers to the industry in the Southeast.

Iowa has excess turkey processing capacity. Because of the excess U.S. production capacity, it is cheaper to transport turkeys into Iowa for processing than to build more turkey production facilities in Iowa.

The existence of three processing plants in the state provide viable marketing alternatives to existing producers.

Demand

U.S. per capita turkey consumption has been stagnant since 1990 and turkey exports declined in 1998 and 1999.

Yet, market driven decline in U.S. turkey production and a demand for deli-style meats beginning in the last half of 1998 resulted in higher prices for turkey breasts and restored profitability to the U.S. turkey industry.

One way to increase demand may be to promote the product in export markets. Current exports are dominated by low-cost products. This is not a good foundation for higher U.S. production. It may be possible to promote sales of U.S. turkey internationally based on health characteristics.

Case-ready, branded, value-added products that are consumer-friendly also offer opportunities for demand growth. These products are further-processed and generate more value and jobs within Iowa.

The upper Midwest has much to gain from new product development. The ISU Meat Lab has excellent facilities for developing new products.

Recommendations

Given the likely limited growth in U.S. turkey consumption and production, the major short-term emphasis in Iowa should be on reducing costs. Some options to reduce Iowa's production costs include:

- Establishing turkey grower closed cooperatives owned by local grain producers and organized under Chapter 501 of the Iowa Code, enacted in 1996.
- Examining the potential economic advantages of hatchery ownership by producers as a way to control poult costs.

- Joint ownership of high technology, low cost feed mills with sufficient sales that would guarantee the achievement of the economics of single-species, high-speed, 24-hour per day production.

Opportunities to reduce processing costs are:

- Alignments within the Iowa turkey processing industry. For example, Iowa Turkey Products is packaging and labeling whole turkeys for other Iowa processing plants.
- One plant could specialize in producing a particular processed product for other plants.
- Cooperative purchasing could reduce raw material, supplies and transportation costs for all plants.

In an increasingly risky agricultural environment, the investment necessary to sustain and grow the Iowa turkey industry demands effective contractual linkages to assure market access. Producers, and their lenders, will benefit from longer-term, more clearly defined contracts. Steps that may move the industry to better working relationships between producers and processors include:

- Improve communications by formally involving producers in contract development or changes and maintaining ongoing dialogue. Although Iowa turkey producers are not legally organized as a single entity, some type of formal representation of producers meeting with processors would provide producers greater input. Such an arrangement is common in fruit and vegetable contracting where producers/growers are professionally represented in discussions with local processors.
- Increase contract transparency by clearly defining how the base price and incentives are determined. Identify which publicly reported prices for inputs will be used and which facilities and time periods will be used for performance comparisons. In other words, processors should work to address concerns about contract provisions that have financial implications over which producers believe they have little control.
- Consider the development of 5-8 year contracts. Longer contracts might encourage current producers to increase and upgrade their facilities and production and encourage new producers to enter the business.
- Post examples of production and marketing contracts on the Iowa Attorney General's website to allow producers to compare their contracts to others offered.

In the short-run, a drastic increase in Iowa turkey production would create oversupply which may reduce profits of existing growers, direct capital into a low return industry, and have little impact on employment and income. In the long-run, Iowa has much to gain by expanding demand. These steps should be considered:

- Efforts to export the more valuable cuts should be encouraged, as should ISU-led product development for both the U.S. and international markets.
- Processors should be encouraged to explore value-adding opportunities that would include further processing of turkey products. Further processing would add value to Iowa turkeys while offering the potential of expanded markets through the introduction of new products.
- The State of Iowa should provide information and guidance to individual growers, groups of growers and processors to take advantage of future growth opportunities.

If Iowa and the rest of the Midwest can capture most of the cost savings enjoyed by integrated growers, it is likely turkey production will slowly migrate back to the Corn Belt. The political climate in Iowa is supportive of value-adding ventures with some finance and incentive programs available. In addition, the state has a feed-cost advantage, an experienced labor force, competitive processing choices, opportunities for grower ownership, excellent infrastructure, and a strategic location to the market. Iowa is in an excellent position to benefit from any sustained increase in turkey demand and the resulting turkey production.