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Cost of Producing Broilers in Utah, 1951-1952

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COST OF PRODUCING BROILERS IN UTAH, 1951-1952

by

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INTRODUCTION

Broiler production in the United States and in Utah has become increasingly important in the last few years. 1/ It has developed from virtual nonexistence in 1930 to the point where it now produces more than half of the total chicken meat production. Growth has been especially rapid since 1934, when separate statistics on broiler production became available. In 1951, production was about 6 times that of 1940 and for the first time the number of broilers raised exceeded the number of chickens raised from farm production.

In 1951 gross farm income from broilers in the United States was 690 million dollars or about 19 percent of the gross farm income from poultry and eggs. 2/ Nearly 800 million broilers were produced in the United States in 1951. This represented a 31 percent increase over the 1950 production and a 58 percent increase over 1949. The 1944-48 average was approximately 308 million birds.3/

Utah's broiler production before 1950 was not recognized as being sufficient in numbers to be listed separately from farm chicken. Prior to this date statistics are not available on broiler production in the state. The gross income from the production of broilers in Utah was $1,322,000 in 1951 compared to $629,000 in 1950. The 1951 production

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1/ The Bureau of Agricultural Economics defines a broiler as a young chicken of the heavy breeds to be marketed at from 2 to 5 pounds live weight. This definition will be followed in the study.

2/ Bureau of Agricultural Economics U.S.D.A. Farm production, disposition, cash receipts and gross income. Chicken and eggs. 1949-1950, 1950-1951.

3/ Agricultural Statistics. U.S.D.A. 1951.

in Utah, almost one and one-half million birds, was 103 percent above 1950. 4/

4/ Op. C. T. 2

PURPOSE OF STUDY

There have been no detailed economic studies published of broiler production in Utah. This analysis is concerned with some of the aspects of this enterprise. The objectives of this study are to determine: (1) the nature and amount of the physical inputs in the production of broilers, (2) the costs and returns of producing broilers in 1951-1952, (3) the relationships of various management and other efficiency factors that relate to the profitableness of producing broilers.

REVIEW OF LITERATURE

With the increasing importance of broiler production in the United States have come several valuable studies of the industry. While economic studies relating to broiler production in Utah had not been undertaken before the analysis, studies have been completed in other areas showing the costs and returns in the production of broilers. These studies are of importance in analyzing the economic conditions affecting the production of broilers and give some assistance in studying the industry in the state of Utah. In methods of procedure and as a basis of comparison they are of particular value.

During the winter of 1948-1949 a study was made in Delaware relative to the cost of producing broilers. This work by McAllister and Bausman covered management practices affecting costs and returns. Their analysis indicated that the average price received per pound on 102 lots of broilers was 31.8 cents and the cost per pound was 31.2 cents. The labor return was $53 per 1000 broilers or 1.7 cents per pound. The study also showed that the producers with the highest returns, had the following: size of flocks - at least 20,000 to 25,000 birds; feed per pound of broiler produced - not more than 3.1 pounds; rate of gain - at least 0.252 pounds per bird per week; age and weight when sold - 12 to 13 weeks and about three pounds, respectively; mortality rate - not more than 6.4 percent. A similar study by Bausman for the Delaware Experiment Station in 1946 showed labor returns were $190 per 1000 broilers or 6.2 cents per pound. In 1946, the average price received per pound was 34.6 cents and the cost per pound was 29.0 cents.

This analysis indicated that costs were influenced by size of flocks, labor efficiency, mortality, floor space per chick, age of chicks when sold, quality of chicks, and feeding practices.

A study of broiler costs and returns and their relation to management practices was made by Plaxico in 1946-1947. This work was reported by the Virginia Agricultural Experiment Station in 1949. The average cost of production on the 293 lots of broilers studied was 31.5 cents per pound, and average receipts amounted to 31.6 cents per pound. There was an average net gain of 0.1 of a cent per pound, or 0.4 cents per bird. Percent mortality was 10.3, average weight at sale was 3.2 pounds, and birds were sold at an average age of 55 days. Plaxico also reported a study in 1950 which was a comparison of the 1946-1947 study with a similar study made in 1947-1948 in Virginia. Broilers were a more profitable enterprise during the year ended September 30, 1948, than in the preceding year. Percent mortality was lower the second year, but rate of gain was exactly the same. Only 94.1 hours was required to tend 1,000 birds on the 124 farms studied the second year, compared to 167 hours on the 104 farms studied the first year. Difference in feed efficiency was the most significant difference in the data for the two years. Only 4.0 pounds of feed were required to produce a pound of broiler the second year, compared to 4.4 pounds of feed per pound of broiler the first year.

Johnson, et al. made a study of 264 lots of broilers in southern and northeastern Indiana. The analysis reported by the Purdue University Agricultural Experiment Station showed costs and returns from broilers 1946-1948. Net returns per 1,000 birds sold was $45. Net returns per pound was 1.6 cents while labor returns per hour was $1.31. Death

losses in the two-year period averaged 10.9 percent of the chicks ordered. Pounds of feed per pound of broilers raised was 3.7. It required 89 hours of labor to raise 1,000 birds.

Production costs amounted to an average of 95 cents per bird sold, or 24.3 cents per pound of broiler produced on 170 broiler farms in Maine in 1944. Perry and Dow of the Maine Agricultural Experiment Station reported that these costs included approximately 63 percent for feed, 14 percent for chicks, 14 percent for labor, 5 percent for use of buildings and equipment, and 4 percent for miscellaneous costs. The average investment per 100 chicks was $23. The average net return or profit was 19 cents per bird, or 4.8 cents per pound of broiler produced. The labor return was $1.40 per hour of labor.

Two hundred and sixty nine lots were reported in a study conducted by the West Virginia Agricultural Experiment Station. The analysis made by Clarke showed that the net return was 4.4 cents per pound of broiler sold and 14.5 cents per bird. Production costs amounted to 25 cents per pound and 82.9 cents per bird sold. Mortality appeared to be the dominant factor responsible for varying production costs. Low mortality was associated with low costs and high mortality with high costs.

White and Paarlberg reported returns per broiler above feed cost in various producing areas, 1941-1942 and 1947-1948. Their figures showed that the 4 year average in Indiana was 49.5 cents, Arkansas 43.5 cents, Del-Mar-Va area 41.0 cents, and Georgia 35.8 cents. Their calculations were based on a bird weighing 3 pounds when sold, and requiring 11.5 pounds of feed, giving an efficiency of 3.8 pounds of feed for each pound of gain. This study was reported by the Indiana Agricultural

Experiment Station.

Six groups of broilers of different breeds or crosses were hatched on November 24, 1950, and raised at the Oklahoma Agricultural Experiment Station. They were weighed at eight weeks and six days of age and marketed the following day. Godfey, et al reported that one lot had a mortality rate of 5.2 percent, the birds averaged 2.48 pounds in nine weeks and the return per bird over feed cost was 32 cents. Their feed conversion was 2.81. The least profitable lot returned 23 cents per bird over feed cost.

The State of California Poultry Improvement Commission conducted a contest reported in 1952 on broiler production. Chicks were entered from different hatcheries. Each entry in the test consisted of 100 straight run day-old chicks selected at random, by an offically designated person, from the entire day's hatch. Each entry was brooded and penned separately and given uniform treatment. At the end of 11 weeks the winning birds weighed 4.09 pounds with a feed conversion of 3.14 pounds. The winning entry's average income over feed cost was 50 cents per bird. Incomes ranged from 50 cents to 12.3 cents per bird. This study called attention to the fact that the net income was income over feed cost only and included no charge for labor, chicks, interest, depreciation, etc.

A thesis study presented to the Graduate College of the University of Illinois, August, 1950 by S. T. Rice and later reported by the Delaware Experiment Station, is worth noting. This study deals with the cost advantage or disadvantage of the Delaware broiler industry relative to the Shenandoah Valley of Virginia, north Georgia, northwestern Arkansas and three areas in Indiana. Rice reported that the cost of

producing broilers in Delaware was lower than in Georgia but about the same as, or slightly higher than, in the other areas studied. In all cases feed and chicks accounted for over 80 percent of total costs with labor being the third most important cost. Broiler production efficiency was about equal in all areas studied (Appendix table I).

SOURCE OF DATA AND METHOD OF STUDY

The data were collected during the period March 1 to July 1, 1952 from 78 broiler producers in Utah. The information included costs and returns for 128 lots of broilers of which 38 were spring, 29 summer, 31 fall, and 30 winter lots. It is estimated that this study covers approximately 22 percent of the broilers produced in the state.

Broiler production in Utah is primarily centered in Cache, Box Elder, Weber, Davis, Salt Lake, Utah, Sanpete, and Sevier Counties. These areas were selected for the sample. By personal interview a survey was taken at the farm and whenever possible the accuracy of each record was checked with other sources such as feed dealers, and processors, contractors, and financiers of broiler enterprises in the various areas. Names and addresses of broiler growers had been obtained previously from these concerns.

The data were recorded on a schedule designed to show costs, receipts, and various management and production practices associated with the growing of broilers. After the records were collected, each was checked and summarized. The records were then classified, recorded, and summarized to facilitate analysis. Selected data were recorded on a type of sorting cards to assist in ascertaining the relationships among factors.

ANALYSIS AND PRESENTATION OF DATA

The analysis of this study is presented in four sections. The first section gives a description of the enterprises. The second section presents an analysis of the costs and returns of producing broilers in Utah 1951-1952. The third section is made up of an analysis of the factors influencing costs and returns. The final section is composed of a summary and conclusions of the study.

Description of the enterprises studied

Data were collected from 78 producers of broilers in Utah. Sixty percent of the producers interviewed had non-farm employment at least part of the year. Some of the off-farm jobs reported were real estate broker, mill or mine worker, barber, truck driver, school teacher and merchant (table 1). The remaining 40 percent or those who reported

Table 1.- Types of non-farm employment of 78 Utah broiler producers, 1951-52.

Job	Number
Merchant	4
Teaching or school work	7
Mill or mine	13
Defense plant work	4
Transportation, trucking, etc.	5
Clerks	2
Real estate broker	1
Justice of peace	1
Canning factory worker	4
Carpenter	2
Other	4
Total	47

no non-farm employment usually had other farm enterprises. Laying flocks, turkeys, dairying, livestock, and crops were the most common enterprises that were carried on with broiler production. Six producers reported that their major source of income was from the production of broiler chickens.

Full or part-time enterprise. Each lot was calculated to be a full or a percentage of a full-time broiler enterprise for one man. The number of days between the time the birds were started and sold was multiplied by 10 hours. This would give the total hours available to care for the birds by one man working 10 hours a day under usual farm conditions. This figure, which would be considered a full-time broiler enterprise, was divided into the total hours reported by the producer to care for a lot in order to give the percentage his operation would be of a full-time job. Only 4 lots were of sufficient size to give one man a full-time job or more while 88 lots were 40 percent or less than full-time. Thirty-six were from 41 to 99 percent of a full-time job (table 2). In over 90 percent of the lots the labor was performed almost exclusively by the operator or his family.

Table 2.- Percent each lot was of full-time broiler operation, Utah, 1951-1952.

Percentage	Number
Less than 20	19
21 to 40	69
41 to 60	30
61 to 80	5
81 to 99	1
100 and over	4
Total	128 lots

Capital requirements. The average investment in land, buildings, and

equipment or fixed capital per lot was $1306 or 43 cents per chick raised. Operating capital amounted to $488 per lot or 16 cents per bird raised when converted to a yearly basis. However, on a seasonal or lot basis the average requirement for operating capital was $2763. The average total investment in Utah on 128 lots was $1794 per lot or 59 cents per chick (table 3). Fixed capital or land, buildings, and equipment amounted to 73 percent of the investment in broilers. Sixteen percent of the total capital was made up of feed, chick, labor, and material costs.

Table 3.- Distribution of broiler capital, Utah, 1951-52.

	Value per lot	Value per bird	Percent
Fixed capital	$1,306	.43	73
Operating capital	488	.16	27
Total	$1,794	.59	100

Source of operating capital. Seventy-seven of the 78 producers reported that short term credit was used to finance their broiler enterprises. Most of the producers in this state turned to feed dealers and buyers or marketing agencies for this credit. There were a number of different contracts used but three types were most commonly used in Utah. They were as follows: (1) The creditor allowed enough credit to the producer to cover feed, chick, and some supply costs. Interest was charged at the rate of 6 percent for the period the credit was used. (2) The creditor supplied the feed, chicks, fuel, litter, and medicines. The producer furnished the labor, lights, water, etc. From the receipts was subtracted feed, chick, and normal brooding expenses. This balance was divided 75 percent to the grower and 25 percent to the creditor.

(3) The creditor supplied the feed, chicks, and retained ownership of same. The producer was paid an agreed amount for each bird raised. There are, of course, variations of these three plans, but the contracts described above were the most commonly used.

Analysis of cost factors

Costs are the market prices times the quantities of the physical inputs needed in broiler production. This section presents an analysis of cost factors related to producing broilers.

Production costs averaged 96 cents per bird sold, or 30.9 cents per pound of broiler produced. Costs per pound ranged from 24.5 to 56.6 cents per pound on the 128 lots. These costs included approximately 60 percent for feed, 20 percent for chicks, 11 percent for labor, and 9 percent for miscellaneous costs (table 4).

Table 4.- Cost of producing broilers, Utah 1951-1952.

Item	Per 1000 birds raised				Percent total cost
	Unit	Amount	Price per unit	Total cost	
			Dollars	Dollars	Percent
Feed	cwt.	105	5.44	571	59.6
Chick	chick	1000	.19	192	20.0
Labor	hours	98	1.05	103	10.7
Housing	dollars			23	2.4
Capital charges:					
Fixed	dollars	1599	.05	21	2.2
Operating	dollars	592	.06	10	1.0
Fuel				17	1.8
Litter				7	.7
Water & lights				5	.5
Taxes				4	.4
Insurance				3	.3
Medicine				2	.2
Misc.				1	.2
Total				959	100.0

Feed Costs. Feed costs constitute about 60 percent of the total production costs. An average of 10,500 pounds of feed was fed per 1000 birds raised at a cost of $571. Feed costs per pound of bird raised ranged from a low of 14 cents to a high of 32 cents per pound with an average of 18 cents.

Broiler rations varied little among the 128 lots. One-hundred and fifteen lots were raised on an all-mash ration. Some of the mash reported was medicated for disease control. The average price of broiler mash was $5.44 a hundred. Only one producer reported that he mixed his own mash. Most mashes were mixed by feed companies and then purchased by the producer. A mash and scratch ration was fed to 13 lots. This ration was composed of quantities of wheat, corn, and other grains fed with broiler, starting, or growing mash. Occasionally this ration was supplemented with semi-solid buttermilk.

Chick costs. The average price paid for chicks was 19 cents and represented 20 percent of the total cost of production (table 4).

Table 5.- Breeds of broilers produced in Utah, 1951-52.

Breed	No. of lots	Percent of total
New Hampshires	120	93.7
Cornish-Hampshires-cross	2	1.6
Rhode Island Reds	1	0.8
Golden Broads	1	0.8
White Rocks	1	0.8
Mixed lots	3	2.3
Total	128	100.0

Approximately 94 percent of the 128 lots were New Hampshire Reds (table 5).

Utah hatcheries supplied only 10.3 percent of the broiler chicks used in Utah. About 47 percent of the chicks started came from

California, Oregon, or Washington. Idaho supplied 42 percent of the chicks used in Utah but this figure shows some bias since many northern Utah producers were under contract with a creditor with headquarters in Idaho who furnished both chicks and feed (table 6).

Table 6.- Sources of broiler chicks, Utah, 1951-52.

State	Number	Percent of total
Utah	43,150	10.3
Idaho	175,325	41.9
California	84,395	20.2
Washington	82,783	19.8
Oregon	30,375	7.3
Massachusetts	2,000	.5
Total	418,028	100.0

Labor costs. Labor was the third most important item of cost in broiler production amounting to about 11 percent of the total costs (table 4). The average charge for labor per hour was $1.05. This rate was obtained from the producer, and represents the value of his labor per hour comparable to what he would have paid to hire the labor or what wage he would receive for similar work. About 301 hours of man labor were required to raise a lot of 3266 broilers. Operator and family labor represented about 92 percent and hired 8 percent of the total hours required to raise a lot. Daily routine or chores required 245.4 hours or about 82 percent of the total labor requirements per lot. The daily routine included such tasks as feeding, watering, tending stoves, stirring litter and similar tasks. Cleaning-up after required 22 hours per flock or approximately 7 percent of the total labor requirements (table 7).

Miscellaneous costs. Interest on operating capital, depreciation and repair of buildings and equipment, interest on fixed capital, taxes,

Table 7.- Man labor required to produce a lot of broilers in Utah, 1951-52.

Operation	Operator	Family	Hired labor	Total	Percent of total
	Hours	Hours	Hours	Hours	Percent
Procuring chicks feeds & supplies	6.6	-	.5	7.1	2.4
Preparing brooder and house	9.4	1.3	.8	11.5	3.8
Daily routine care	216.2	21.5	7.7	245.4	81.6
Clean-up after lot	14.7	1.4	5.9	22.0	7.3
Crating and loading	4.3	.8	8.9	14.0	4.7
Miscellaneous	.6	.1	-	.7	.2
Total	251.8	25.1	23.8	300.7	-
Percent	83.7	8.4	7.9	100.0	100

insurance, and material costs are shown as miscellaneous costs. About 9 percent of the total cost of production were miscellaneous costs (table 4).

The capital invested in feed, chicks, labor, and material comprised the operating capital. Interest was calculated by charging interest on these costs for the period the birds were maintained at the rate of 6 percent per annum. Interest on operating capital represented 1.0 percent of the total costs.

Each schedule contained a complete inventory of the producers land, building and equipment. Buildings and equipment were valued on the replacement costs basis. An estimate was made of the present cost of replacing the building. This value was then depreciated 3 percent per year according to the age of the building to get the present value.

The yearly depreciation on the buildings and equipment was divided by the number of lots raised per year. This figure represented the

depreciation for the period the birds were maintained. The cost of repairs was handled in a like manner. Depreciation and repair to buildings and equipment represented 2.4 percent of the total costs.

Fixed capital included the land, buildings, and equipment. The interest charge at the rate of 5 percent per annum was prorated among the number of lots raised per year.

The charge for taxes per lot was calculated by taking the mill rate times the value base for taxable capital. Total taxes for one year were then divided by the number of lots produced in one year in order to allocate a portion of the total taxes to each lot.

Material costs represent only about 4 percent of the total cost in the production of broilers. Such things as fuel, electricity, water, litter, veterinarian service, medicine, insurance, temporary feeders, and miscellaneous items were included as material costs. The cost of the fuel represented about half of the material costs. It is estimated that fuel costs are cut about two-thirds during the summer months. Many different types of heat were used in brooding. Gas stoves were used as a source of heat for fifty-five percent of the 128 lots. Nine producers used either gas, oil, or coal furnaces for heat while only 3 producers reported that radiant heat was used for brooding purposes (table 8). Various types of litter were used in the coops. Straw or wood shavings appeared to be the most common among the producers. Several growers often supplemented these types of litter with shredded sugar cane or peat moss.

Estimating production costs. By use of the average amounts of inputs as developed from this study of 128 lots a method of estimating the total cost per pound of producing broilers under changing levels and relation-

Table 8.- Source of heat used, Utah, 1951-1952.

Source of heat	Lots	Percent of total
Gas stoves	70	54.7
Electric stoves	17	13.3
Combination, oil, gas, coal, etc.	15	11.7
Oil stoves	9	7.0
Furnace - oil, coal, or gas	9	7.0
Coke stoves	5	3.9
Radiant heat	3	2.4
Total	128	100.0

ship of input expenses can be formulated. Ninety-one percent of the costs of producing broilers consisted of feed, chicks, and labor. Therefore, any changes in the prices of these items may give an indication of cost trends in broiler production.

The first step in computing total production costs is to multiply 3.4, the average pounds of feed required to produce a pound of broiler, times the price per pound of broiler feed. The second step is to multiply .032, the average hours of labor required per pound of broiler, times the current hourly wage. The third step is to multiply .34, an adjustment factor to reduce the cost per chick to the cost per pound of broiler, times the current cost per chick. This adjusted figure is calculated by multiplying 3.1, the average weight of the bird at sale, times 93.9, the average percent produced of the total birds started, and dividing this total into 1 cent. The fourth step is to add the totals of these three steps, and then divide by 91 percent and multiply by 100 to adjust the costs for the remaining 9 percent of the costs which were miscellaneous.

The application of this method to the present study is as follows:

Step one: 3.4 x 5.44 cents = 18.50 cents or cost of feed per pound of broiler.

Step two: .032x $1.05 cents = 3.36 cents or cost of labor per pound of broiler.

Step three: .34 x 18 cents = 6.12 cents or cost of chicks per pound of broiler.

Step four: 27.98 cents per pound = 91% of cost items

Step five: Total cost per pound $\frac{27.98}{91 \text{ percent}}$ x 100 = 30.75 cents

If at the beginning of a seasonal lot a producer could estimate the cost of feed during the production period to be $5.00 per cwt., the cost of labor at $1.00 per hour and could buy chicks for 16 cents per chick then he could estimate his total cost of production to be 28.17 cents per pound as follows:

3.4 x $.05 per pound = 17.00 cents for feed

.032 x $1.00 per hour= 3.20 cents for labor

.34 x $.16 per chick = 5.44 cents for chick

25.64 cents per pound for 91 % of cost items.

$\frac{25.64 \text{ cents}}{91 \text{ percent}}$ x 100 = 28.17 cents per pound of broiler produced.

Receipts and net returns

Broiler sales represented 98.7 percent of the total receipts in the production of broilers in Utah. The remaining receipts included the value of the birds eaten at home, the value of the litter, and refunds (table 9).

Producers generally keep some of their birds for home consumption. About 43 pounds of chicken per lot valued at $13 was retained for home use.

The elemental fertilizer value of the litter was considered to be the total value of the litter. On this basis the litter was determined to be worth 70 cents per 100 birds raised.

Table 9.- Total receipts and net returns from broiler production in Utah, 1951-52.

Item	Per lot				Receipts per 1000 chicks raised	Percent of total receipts
	Unit	Amount	Price	Total received		
	lbs.		Cents	Dollars	Dollars	Percent
Sales	lbs.	9472	30.3	2872	936	98.7
Home use	lbs.	43	30.3	13	4	.5
Value litter	-	-	-	21	7	.7
Refunds	-	-	-	4	1	.1
Total receipts	-	-	30.6	2910	948	100.0
Total expenses	-	-	-	2943	959	101.2
Net returns	-	-	-	- 33	- 11	- 1.2

Receipts per 1000 birds raised was $948 this amounted to $2910 per lot or 30.6 cents per pound of broiler. Receipts per pound ranged from 26.1 to 37.0 cents per pound on the 128 lots.

Net returns per pound on the 128 lots ranged from minus 19.6 cents to 7.8 cents per pound. The net returns per pound was calculated by deducting the total costs from total receipts and dividing by the pounds of broiler raised. Seventy-three lots had negative net returns per pound ranging from a minus 19.6 to minus 0.2 cents while 55 lots had positive net returns per pound ranging from 0.3 to 7.8 cents. Since no cost of management has been included in the total costs, net return per pound may be considered a return to management. Net returns per lot averaged a minus $33 or minus $11 per 1000 birds raised.

Although net returns were a minus $33 per lot, employment for the operator and family labor, and fixed capital, was provided by raising a lot of broilers. Even though labor and fixed capital were costs to a lot, they were also returns to the operator and family to the extent that

the operator's own capital was used.

The average return to the operator and his family for labor and management was $258 per lot when the cost of the operator and family labor was added to net returns (table 10). By adding the return to

Table 10.- Return to operator and family, capital, and management, Utah 1951-1952.

Item	Per lot
	Dollars
Net return	- 33
Cost of operator and family labor	291
Return to operator and family labor and management	258
Charge for use of fixed capital	65
Return to fixed capital, operator and family labor and management	323

operator and family labor plus management to the charge for the use of fixed capital, $323 per lot represents what the operator and family received from the production of a lot of broilers, for their labor, fixed capital, and management.

Analysis of factors influencing costs and returns

There are many factors which influence the costs and returns. The 128 lots were analyzed to determine what factors influenced costs and returns. To analyze relationships the tabular analysis method was used. The records were classified into groups according to one factor in an effort to hold the affect of that factor relatively constant. It was then possible to see the variations in other factors as the factor on which the records were sorted varied.

Size of lot. In farm operations the size of the business is thought to be associated with costs and returns. To show the relation of size of the lot to net returns and other factors, a sort was made on the basis of size (table 11). Five groups were made. The first group consisted of

Table 11.- Size of lot related to costs and returns and other factors, Utah, 1951-52.

No. of chicks started Range	Average	Lots	Feed* conversion	Labor per 100 birds raised	Fixed Capital inv. per bird	Total cost per lb.	Net returns per lb.
No.	No.	No.	lb.	Hours	Cents	Cents	Cents
Less than 1500	1038	19	3.7	24	68	37.4	- 7.0
1500 - 2499	1949	41	3.5	12	48	33.2	- 2.8
2500 - 3499	2775	26	3.5	10	43	31.4	- 0.9
3500 - 4999	3981	17	3.4	10	46	30.6	- 0.4
5000 and over	7143	25	3.3	7	38	29.2	1.7
All lots	3266	128	3.4	9.8	43	30.9	- 0.3

* Pounds of feed fed per pound of broiler raised.

lots with less than 1500 birds; the second, 1500 to 2499; the third, from 2500 to 3499; the fourth, from 3500 to 4999; and the last had 5000 birds and more. There was an average of 1038 birds in the first class interval of 19 lots, 1949 birds in the 41 lots of the second, 2775 birds and 26 lots in the third, 3981 birds in the 17 lots of the fourth, 7143 birds in the fifth with 25 lots. The range in size of lots was from 500 to 14000 birds.

As size of the lot increased, costs per pound consistently decreased and net returns increased. Costs decreased from an average of 37.4 to 29.2 cents per pound and net returns per pound increased from a minus 7.0 to 1.7 cents as size of lot increased from an average of 1038 to

7143 birds per lot. As size of lot increased from the smallest to the highest, labor per 100 birds decreased from 24 to 7 hours and fixed capital investment decreased from 68 to 38 cents per bird. Feed efficiency tended to increase as size of lot increased. The group of smallest flock had an average feed conversion of 3.7 pounds while the group of largest lots averaged 3.3.

There was no significant association between size of lot and death loss.

Season birds were produced. The season of the year the birds were produced did show some association with costs and returns. The lots were divided into four groups according to the season produced. If a lots primary production period was during March, April, or May it was called a spring lot, lots produced primarily during the months of June, July, and August were summer lots, fall lots consisted of lots produced during September, October, and November, lots that were grown during December, January, and February were listed as winter lots (table 12).

The small differences noted in costs and returns from producing seasonal lots of broilers was primarily due to two factors. First, seasonal variation in price caused receipts to be higher during the spring and summer months. Second, broilers were seasonally competing with other meats especially turkey which often necessitated the holding of birds longer causing higher production costs.

In terms of physical factors there was little noticeable difference among the various seasons. Feed conversion was about the same, labor requirements were practically the same, size of the lot varied less than 4 percent, the birds were produced at about the same rate of gain per day and the death loss was little different.

Table 12.- Relationship between season of year produced and costs and returns and other factors, Utah 1951-52.

Season*	Lots	No. chicks started	Age of bird at sale	Average weight at sale	Percent death loss	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Total receipts per lb.	Net returns per lb.
	No.	No.	Days	lb.	Percent	lb.	Hours	Cents	Cents	Cents
Spring	38	3210	79	3.0	4.8	3.4	10	30.9	31.6	0.7
Summer	29	3254	81	2.9	7.0	3.2	9	29.9	31.4	1.5
Fall	31	3335	87	3.3	6.4	3.5	10	30.6	29.5	- 1.1
Winter	30	3277	82	3.1	6.4	3.5	10	32.3	29.8	- 2.5
All lots	128	3266	82	3.1	6.1	3.4	9.8	30.9	30.6	- 0.3

* Spring: March, April, May
Summer: June, July, August
Fall: September, October, November
Winter: December, January, February

Percent mortality. Percent mortality was an important factor affecting costs and returns. The death loss was based on the number purchased, and although some extra chicks were given by the hatcheries the percent death loss is over and above any extra chicks that may have been started. Percent mortality ranged from 0.2 percent to a high of 31.4 percent.

In order to show the association between the death loss and various factors, the records were sorted on the basis of percent mortality. The measure of success or profitableness used was net return per pound (table 13). The data were divided into three groups according to percent mortality, 0 to 3.49 percent in the first group, 3.5 to 6.99 percent in the second group, and 7.0 percent and over in the third group. There were 35 lots in the lowest group with an average of 1.8 percent. The second group has an average of 4.7 percent with 52 lots, and the last group consisted of 51 lots with an average of 11.7 percent mortality.

Increased mortality was accompanied by higher production costs and lower net returns. As percent mortality increased from the lowest to the highest group, total costs per pound increased from 29.5 to 33.1 cents, feed costs per pound of broiler raised increased from 17 to 19 cents, and net returns per pound decreased from a 0.6 to minus 2.4 cents per pound.

Death loss was also associated with other factors. Feeding efficiency or pounds of feed required to produce a pound of broiler increased from 3.2 to 3.6 pounds as mortality increased from an average of 1.8 to 11.7 percent. There was apparently no relationship between mortality and size of the lot. A high fixed capital investment per bird was not associated with low mortality which might be expected since higher fixed capital investment per bird may reflect better equipment and buildings. There is an interesting relationship between percent mortality, age of bird at sale, and rate of gain. As percent mortality increased age of

Table 13.- Percent mortality related to costs and returns and other factors, Utah, 1951-52.

No. of chicks started		Lots	Age of bird at sale	Rate of gain per day	Feed conversion	Feed cost per lb. of bird	Fixed capital inv. per bird	Total costs per lb.	Net returns per lb.
Range	Average								
Percent	Percent	No.	Days	lb.	lb.	Cents	Cents	Cents	Cents
0 - 3.49	1.8	35	79	.040	3.2	17	44	29.5	0.6
3.5 - 6.99	4.7	52	80	.038	3.4	18	48	30.4	0.3
7.0 and over	11.7	41	87	.036	3.6	19	50	33.1	- 2.4
All lots	6.1	128	82	.038	3.4	18	43	30.9	- 0.3

bird at sale increased from 79 to 87 days and rate of gain per day decreased from .040 to .036 pounds.

Feeding efficiency. It is generally expected that efficient use of feed and correct feeding practices reduce costs and may bring higher net returns. To measure feeding efficiency the pounds of feed needed to produce a pound of broiler was selected and a sort was made on this basis (table 14). It is recognized that this measure would include differences in quality of feed, chicks, and feeder. The records were sorted into five groups on this basis ranging from the lowest to the highest. In the first group of 40 lots feed conversion averaged 2.8 pounds and in the last group of 11 lots it averaged 4.6 pounds. Pounds of feed required to produce a pound of broiler on all lots ranged from 2.6 to 5.8 pounds.

When the records were sorted on this basis, it was found as the pounds of feed required to produce a pound of broiler increased from an average of 2.8 to 4.6 pounds, costs per pound increased from 27.9 to 40.0 cents, feed cost per pound of broiler raised increased from 16 to 25 cents, and net returns per pound decreased from 2.9 to minus 9.3 cents. As pounds of feed required to produce a pound of broiler increased percent mortality increased from 4.2 to 12.6 percent, age of birds at sale from 75 to 91 days, and labor per 100 birds from 9 to 15 hours. There was a positive relationship between feeding efficiency and size but this association was more pronounced when the records were sorted on the basis of size.

Feeding practice. Ninety percent of the lots studied were raised on a straight broiler mash ration. Thirteen lots representing 10 percent of the lots were fed on a mash and scratch ration. To show the effect the type of ration might have on costs and returns, a sort was made on this basis (table 15). The lots were divided into two general groups, lots

Table 14.- Feed fed per pound of broiler raised related to costs and returns and other factors, Utah, 1951-52.

Feed conversion			No. of chicks started	Age of bird at sale	Average weight at sale	Percent death loss	Labor per 100 bird raised	Feed cost per lb. of broiler	Total costs per lb.	Net returns per lb.
Range	Average	Lots								
Lbs.	Lbs.	No.	No.	Days	Lbs.	Percent	Hours	Cents	Cents	Cents
Less than 3.0	2.8	18	3532	75	3.0	4.3	9	16	27.9	2.9
3.0 - 3.3	3.2	40	4320	78	3.1	5.2	8	17	29.2	1.2
3.4 - 3.7	3.5	34	2674	83	3.1	6.8	12	19	32.4	- 1.7
3.8 - 4.1	3.9	25	2794	87	3.3	6.8	11	21	33.5	- 2.8
4.2 and over	4.6	11	1900	91	3.0	12.6	15	25	40.0	- 9.3
All lots	3.4	128	3266	82	3.1	6.1	9.8	18	30.9	- 0.3

Table 15.- Relationship of feeding practice to costs and returns and other factors, Utah, 1951-52.

Feeding practice	Lots	Age of bird at sale	Percent death loss	Labor per 100 bird raised	Feed conversion	Total costs per lb.	Net returns per lb.
	No.	Days	Percent	Hours	lb.	Cents	Cents
Mash and scratch	13	92	8.0	12	3.8	31.3	-.009
Mash	115	81	5.8	9	3.3	30.9	-.003
All lots	128	82	6.1	9.8	3.4	30.9	- 0.3

fed on a straight broiler mash ration in one group and those fed quantities of grain and other feedstuffs along with mash in another.

When a sort was made on feeding practices, the straight broiler mash ration gave the better results. Costs per pound were 31.3 cents and net returns were a minus 0.9 cents per pound when the mash and scratch ration was fed. When straight broiler mash was fed costs per pound were 30.9 cents and net returns per pound were a minus 0.3 cents. The average size of the lots were approximately the same in both groups but lots fed the all mash ration took 3.3 pounds of feed to produce a pound of broiler and had a 5.8 percent mortality rate as compared to 3.8 pounds of feed to produce a pound of broiler and a 8 percent mortality rate when the mash and scratch ration was used. The broilers fed on an all mash ration were ready for market at a younger age and thus required fewer hours of labor per 100 birds than birds fed the mash and scratch ration. Feeding two kinds of feed may have been more time consuming also although this was not determined.

It is noted further that the lots fed the mash and scratch were below the average in all factors when compared to the averages on all

the lots in the study. The lots receiving an all-mash ration were equal to or above average on all factors. This probably indicates that the scratch which was no doubt fed in an attempt to reduce feed cost merely served to throw the total ration out of balance and the results show the effect of feeding an unbalanced ration as against a better balanced ration.

Degree of specialization. As noted previously each lot was classified on the basis of its percentage of a full-time operation. To show what effect this consideration may have on costs and returns a sort was made on this basis (table 16). The lots ranged from 5 to 157 percent of a full-time operation.

Lots that averaged 31 percent or less of a full-time job showed small negative net returns per pound. There was no significant relationships between the percent the lot was of a full-time operation and other factors.

Table 16.- Degree of specialization related to costs and returns, Utah, 1951-52.

Degree of specialization		Lots	No. of chicks started	Percent death loss	Feed conversion	Total costs per lb.	Net returns per lb.
Range	Average						
Percent	Percent	No.	No.	Percent	lb.	Cents	Cents
25 and less	19	44	2074	5.6	3.5	30.9	- 0.1
26 - 35	31	28	2506	7.3	3.5	32.7	- 2.4
36 - 45	41	30	3584	5.1	3.3	30.3	0.1
46 and over	68	26	5734	6.5	3.3	30.7	-
All lots		128	3266	6.1	3.4	30.9	- 0.3

Measures of physical input and output were practically the same among the various classes of this sort. This sort indicates that broilers can be

produced successfully on a part-time basis. However, specialization may be more profitable if coupled with efficiency.

Fixed capital investment per bird. Investment in buildings and equipment generally play an important role in the profitableness of a farm enterprise. Some enterprises may be over-built or have too much invested in buildings and equipment to be profitable. In an attempt to show the relationship of fixed capital investment to costs and returns a sort was made on the basis of fixed capital investment per bird (table 17). The records were divided into three groups. Forty-four lots averaged 25 cents per bird, 43 averaged 46 cents, and 42 averaged 73 cents fixed capital investment per bird. Fixed capital investment per broiler on all lots averaged 43 cents per bird with a range from a low of 10 cents to a high of $1.64 per broiler.

Table 17.- Fixed capital investment per bird related to costs and returns, Utah, 1951-52.

Fixed capital investment per bird			No. of chicks started	Percent death loss	Labor per 100 birds raised	Total costs per lb.	Net returns per lb.
Range	Average	Lots					
Dollars	Dollars	No.	No.	Percent	Hours	Cents	Cents
.10 - .36	.25	44	4108	5.9	8	29.0	1.6
.37 - .53	.46	42	3202	5.7	10	31.2	- 0.6
.54 -1.64	.73	42	2448	6.8	13	34.0	- 3.5
All lots	.43	128	3266	6.1	9.8	30.9	- 0.3

A consistent relationship was found between fixed capital investment per bird and net returns per pound. As fixed capital investment per bird increased from 25 to 73 cents per bird, net returns per pound decreased

from 1.6 cents to a minus 3.5 cents per pound, and cost per pound increased from 29.0 to 34.0 cents. It was observed that as fixed capital investment per bird increased, percent mortality, hours of labor per 100 birds increased. As noted previously when a sort was made on the basis of size of lot, capital investment per bird increased while size of the lot decreased.

Labor efficiency. Labor costs represented 11 percent of the total cost of producing broilers. Using hours of labor per 100 birds raised as a measure of labor efficiency a sort was made on this basis (table 18). The records were divided into six different classes. The hours of labor per 100 birds ranged from 3 to 57 hours with an average of 9.8 hours.

The group of 20 lots averaging 5 hours per lot had the lowest cost per pound and had the highest net return. When hours of labor per 100 birds was more than an average of 7 hours, net returns per pound were negative. As labor per 100 birds increased from an average of 10 to 27 hours, net returns per pound decreased from a minus 1.4 to minus 6.0 cents. An inverse relationship existed between hours of labor per 100 birds and size of the lot. As the amount of labor per 100 birds increased, the average size of the lot decreased from 5101 to 2069. These relationships suggest that labor is used more efficiently on the larger lots. This same type of relationship was found when the records were sorted on the basis of size of lot.

It is noted further that when hours of labor per 100 birds increased from the lowest to the highest group, cost per pound increased from 28.2 to 36.2 cents and fixed capital investment per bird increased from 35 to 60 cents per bird. It might be expected that fewer hours of labor per 100 birds would reflect more expensive buildings and better production

Table 18.- Hours of labor per 100 birds related to costs and returns and other factors, Utah, 1951-52.

Labor per 100 birds raised			No. of chicks started	Percent death loss	Feed conversion	Age of bird at sale	Fixed capital investment per bird	Total costs per lb.	Net returns per lb.
Range	Average	Lots							
Hours	Hours	No.	No.	Percent	Lb.	Days	Cents	Cents	Cents
Less than 6	5	20	5101	4.0	3.2	78	35	28.2	2.3
6 - 8	7	30	4303	5.7	3.4	81	35	29.5	1.8
9 - 11	10	24	2717	5.3	3.3	79	51	31.6	- 1.4
12 - 14	13	19	2395	6.8	3.4	82	52	32.8	- 2.4
15 - 17	16	15	2403	7.7	3.5	87	62	34.6	- 4.9
18 and over	27	20	2009	11.3	3.7	89	60	36.2	- 6.0
All lots	9.8	128	3266	6.1	3.4	82	43	30.9	- 0.3

equipment. If this was the case an inverse relationship would exist between labor per 100 birds and fixed capital investment per bird. There occurred, however, a positive association which may be explained from the fact that the size of the lots were smaller as labor per 100 birds increased and the total investment was spread over few birds making capital investment per bird increase as hours of labor per 100 birds increased.

Average weight at sale. The records were sorted on the basis of average weight at sale and divided into five groups (table 19). In the

Table 19.- Average weight at sale related to costs and returns and other factors, Utah, 1951-52.

Average weight at sale Range	Average	Lots	Age of bird at sale	Feed conversion	Feed cost per lb. of broiler	Total costs per lb.	Net returns per lb.
Lbs.	Lbs.	No.	Days	Lbs.	Cents	Cents	Cents
Less than 2.8	2.6	12	81	3.6	20	33.5	- 1.8
2.8 - 2.9	2.9	32	78	3.3	18	31.4	- 0.2
3.0 - 3.1	3.1	41	78	3.3	18	30.9	- 0.4
3.2 - 3.4	3.3	26	85	3.3	18	29.4	1.1
3.5 and over	3.7	17	97	3.7	20	32.2	- 2.1
All lots	3.1	128	82	3.4	18	30.9	- 0.3

first group the average weight at sale was 2.6 pounds and in the last group 3.7 pounds.

Total costs per pound were lowest and net returns per pound the highest when birds were marketed from 2.8 to 3.4 pounds. Birds weighing less than 2.8 pounds and more than 3.5 pounds cost more to produce and showed the smallest net returns per pound, which indicates that birds

marketed too small or too large are generally unprofitable.

Lots averaging 2.9, 3.1, and 3.3 pounds at sale required 3.3 pounds of feed to produce a pound of broiler. When the average weight at sale was less than 2.8 pounds, pounds of feed required to produce a pound of broiler averaged 3.6 pounds and when average weight at sale was 3.5 pounds or more, feed required to produce a pound of broiler was 3.7 pounds.

Age at sale. A sort was made on the basis of the number of days the birds were fed in preparation for market (table 20). The age the birds

Table 20.- Age at sale related to costs and returns and other factors, Utah, 1951-52.

Age of birds at sale			Average weight at sale	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Net returns per lb.
Range	Average	Lots					
Days	Days	No.	Lbs.	Lbs.	Hours	Cents	Cents
Less than 71	69	11	3.0	3.1	7	29.4	- 0.1
71 - 77	74	39	3.0	3.1	8	29.7	0.7
78 - 84	81	38	3.0	3.4	11	31.5	- 0.2
85 - 91	88	22	3.1	3.6	10	32.2	- 1.9
92 and over	102	18	3.6	3.8	13	31.7	- 1.2
All lots	82	128	3.1	3.4	9.8	30.9	- 0.3

were marketed ranged from 65 to 127 days with an average of 82 days.

When birds were sold in less than 71 days or between 71 and 77 days, costs per pound were 29.4 cents and 29.7 cents respectively. Birds held longer cost more to produce and had lower net returns per pound. Lower costs and greater returns were probably due to greater efficiency in the use of labor and better feeding efficiency since only 7 and 8 hours of labor was required per 100 birds and 3.1 pounds of feed were required to

produce a pound of broilers sold on lots sold in less than 71 days or between 71 and 77 days. As age increased, feeding efficiency decreased from 3.1 to 3.8 pounds of feed needed to produce one pound of broiler.

Rate of gain per day. One of the factors affecting costs and returns in the production of broilers was the rate of gain made per day. Rate of gain per day was calculated by dividing the average weight of the bird at sale by the age of the bird at sale. In order to note the association between rate of gain daily and various factors, the records were sorted into five groups on this basis (table 21). The average increase in weight

Table 21.- Rate of gain per day related to costs and returns and other factors, Utah 1951-52.

Rate of gain per day		Lots	Age of bird at sale	Average weight at sale	Feed conversion	Total costs per lb.	Net returns per lb.
Range	Average						
Lbs.	Lbs.	No.	Days	Lbs.	Lbs.	Cents	Cents
less than .035	.032	25	93	3.0	3.8	34.2	- 2.9
.035 - .037	.036	24	82	3.0	3.5	31.2	0.4
.038 - .039	.038	29	81	3.1	3.3	30.7	- 0.4
.040 - .041	.040	23	80	3.2	3.4	30.0	- 0.3
.042 and over	.043	27	74	3.2	3.1	29.2	0.9
All lots	.038	128	82	3.1	3.4	30.9	- 0.3

on all lots was .038 pounds per day. The lowest group of 25 lots gained less than .035 pounds daily, whereas the highest group of 27 lots gained .043 or more pounds per day. The group making the most rapid growth had production costs which averaged 29.2 cents per pound while the group making the slowest rate of gain had production costs of 34.2 cents per

pound.

An inverse relationship existed between rate of gain per day, age of birds at sale, and pounds of feed required to produce a pound of broiler. As rate of gain daily increased age of bird at sale decreased from 93 to 74 days and pounds of feed required to produce a pound of broiler decreased from 3.8 to 3.1 pounds.

Source of feed. Feeds for the 128 lots came from various sources. A concentration around three major sources of feed existed. A fourth group could also be established consisting of miscellaneous feed sources. Since no two sources of feeds would produce feeds exactly alike, a sort was made on the basis of feed source (table 22). The records were divided

Table 22.- Source of feed related to costs and returns and other factors, Utah, 1951-52.

Feed source	No. of chicks started	Average weight at sale	Rate of gain per day	Percent death loss	Feed conversion	Feed cost per lb. of broiler	Total costs per lb.	Net returns per lb.
Dealer	No.	lb.	lb.	Percent	lb.	Cents	Cents	Cents
A	2503	3.2	.037	8.0	3.7	20	33.4	- 2.4
B	4161	3.0	.041	4.2	3.1	17	29.0	0.8
C	3850	3.1	.037	6.4	3.6	19	29.4	2.4
D	3939	3.3	.039	5.3	3.4	18	30.3	0.1
All	3266	3.1	.038	6.1	3.4	18	30.9	- 0.3

into groups A, B, C, D, each letter representing a different source of feed.

In feed source A the average cost per pound was 33.4 cents and net returns per pound averaged minus 2.4. Feed source A was the only group that showed negative net returns per pound. Group B had the lowest death

loss, feed conversion, total costs per pound and the birds were younger at sale. Feed source C with an average of 2.4 cents had the greatest net return per pound of broiler raised. The birds sold at the heaviest weight were produced from feed source E. The net return per pound for this group was 0.1 cents.

The relationships found by making this sort indicate that the compounding of the feed is important in broiler production and that on an average under farm feeding practices some feeds seem to give better results than others. It is apparent that source of feed is closely associated with costs and returns as shown above.

Least profitable, most profitable, and average of all lots. To show the comparison of the most profitable, average, and least profitable lots, the records were sorted on the basis of net returns per pound (table 23).

The average net return per pound of the least profitable lots was minus 7.2 cents while the most profitable averaged 3.2 cents. Cost per pound on the least profitable was 36.7 cents, 28.1 cents on the most profitable, and the average of all lots was 30.9 cents.

From this sort it is apparent that the most profitable lots were larger in size with 4422 birds started per lot while the least profitable lots only started 2153 birds. It is noted further that average investment per bird on all lots was 43 cents and that the least profitable lots had 62 cents and the most profitable lots 39 cents fixed capital investment per bird.

The pounds of feed required to produce a pound of broiler was six-tenths of a pound less in the most profitable lots than in the lots that were the least profitable. Feed costs per pound of broiler raised averaged 17 cents in the most profitable, 21 cents in the least profitable,

Table 23.- Comparison of averages of most profitable third, least profitable third, and average of all lots, Utah, 1951-52.

Item or factor	Unit	Most prof. 1/3	least prof. 1/3	Average all farms
Receipts per bird	cents	96	91	95
Cost per bird	cents	86	113	96
Net returns per bird	cents	10	- 22	- 1
Receipts per pound	cents	31.3	29.5	30.6
Cost per pound	cents	28.1	36.7	30.9
Net returns per pound	cents	3.2	-7.2	-0.3
Feed cost per pound of broiler raised	cents	17	21	18
Rate of gain per day	lbs.	.040	.036	.038
Hours of labor per 100 birds raised	hours	7	16	9.8
Average weight at sale	lbs.	3.1	3.1	3.1
Age at sale	days	78	86	82
Percent death loss*	percent	5.0	8.0	6.1
Pound of feed fed to produce a pound of broiler	lbs.	3.2	3.8	3.4
No. of chicks started per lot	no.	4422	2153	3266
Average fixed capital investment per bird	cents	39	62	43

* Calculated on the basis of number of chicks paid for.

and the average of all lots was 18 cents. In average weight at sale all groups were equal with the birds averaging 3.1 pounds at the time they were marketed. The most profitable lots also excelled in rate of gain per day, and age at sale. It is interesting to note that only 7 hours of labor was required per 100 birds on the most profitable lots while it required 16 hours to raise 100 birds on the least profitable lots. Death loss was 1.1 percent below the average of all lots on the most profitable while on the least profitable lots death loss was 1.9 percent above the average.

Number of factors better than average. Usually the farm enterprises that bring the greatest returns are those which are above average in the

performance of most of the important efficiency factors. Farm managers agree that it is generally better to be fairly good in all efficiency factors than extremely strong in some but weak in others and that the eminently successful producer is one who performs above the average of the group. To show the relationship between factors better than average and cost and returns as sort was made on this basis (table 24). The factors selected were pounds of feed required to produce a pound of broiler, percent mortality, size of lot, hours of labor per 100 birds, and rate of gain per day.

When the records were sorted on this basis some consistent relationships were observed. Costs per pound decreased from a 38.3 to 27.9 cents, and net returns per pound decreased from a minus 7.7 to 2.1 cents as the factors better than average increased from none to five. The relationship is consistent that as factors better than average increase net returns increase.

Feed fed per pound of broiler raised, percent mortality, and hours of labor per 100 birds decreased as factors better than average increased. As the number of factors better than average increased size of the lots increased, and rate of gain per day increased.

The data presented in this sort suggests that returns to an enterprise increase as more factors become better than average. There would be a difference in returns, however, depending upon which factors were better than average. Since feed costs represent 60 percent of the total costs, it is reasonable to conclude that a lot better than average in one factor such as feeding efficiency might have greater net returns per pound than lots better than average in any other one factor. Also lots

Table 24.- Numbers of factors better than average related to costs and returns, Utah, 1951-52.

Factors better than average	Lots	No. of chicks started	Rate of gain per day	Percent death loss	Feed conversion	Labor per 100 birds raised	Total costs per lb.	Net returns per lb.
	No.	No.	lb.	Percent	lb.	Hours	Cents	Cents
None	16	1959	.034	13.8	4.1	16	38.3	- 7.7
One	29	2268	.037	9.0	3.6	16	34.7	- 4.7
Two	25	2571	.038	6.4	3.6	10	31.8	- 0.2
Three	23	3428	.040	5.2	3.3	9	30.7	0.2
Four	24	4812	.040	4.0	3.1	8	28.5	2.0
Five	11	5662	.042	3.7	3.0	5	27.9	2.1
All lots	128	3266	.038	6.1	3.4	9.8	30.9	- 0.3

better than average in three factors such as feeding conversion, number of chicks started, and labor per 100 birds might show greater net returns than a combination of any other three factors.

SUMMARY

1. An economic study was made of 128 lots of broilers produced in Utah during 1951 and up to July 1 in 1952. Records were obtained from 78 producers in eight counties in the state. Approximately 22 percent of the broilers produced during the above period were included by the study.

2. Producers generally had non-farm employment or had other farm enterprises that were carried on with broiler production. Only 4 lots were calculated to be a full-time operation for one man.

3. Fixed capital which included land, buildings, and equipment amounted to 73 percent of the investment in broilers. Seventy-seven of the 78 producers reported that production credit was used to finance the enterprise.

4. Production costs averaged 96 cents per bird raised or 30.9 cents per pound of broiler. Feed accounted for 60 percent, chicks 20 percent, labor 11 percent, and miscellaneous costs 9 percent of the total costs.

5. Receipts per pound of broiler raised ranged from 26.1 to 37.0 cents with an average of 30.6 cents. Broiler sales represented 98.7 percent of the total receipts. Net returns averaged a minus $33 per lot or a minus $11 per 1000 birds raised. Net returns were calculated by subtracting total costs from total receipts.

6. For their labor, fixed capital, and management, the operator and his family received $323 as an average return per lot of 3266.

7. The cost per pound decreased from 37.4 to 29.2 cents as the size of the lot increased while net returns per pound increased from a minus

7.0 cents to 1.7 cents. The range in size of lot was from 500 to 14,000 birds.

8. The average mortality was 6.1 percent. Increased mortality was associated with higher production costs and lower net returns. Pounds of feed required to produce a pound of bird increased from 3.2 to 3.6 pounds as mortality increased from an average of 1.8 to 11.7 percent, and age of bird at sale from 79 to 87 days.

9. An average of 3.4 pounds of feed were required to produce a pound of bird on the 128 lots. As feeding efficiency increased costs per pound decreased and net returns per pound increased.

10. Labor costs represented 11 percent of the total costs of producing broilers. Only 8 percent of the labor was hired. As labor per 100 birds decreased net returns per pound increased and cost per pound of broiler decreased.

11. Costs decrease as the rate of gain per day increased. A low feed conversion was associated with a poor rate of growth.

12. The compounding of feed ration was important in broiler production as some feeds gave better results than others.

13. Eleven lots better than average in five factors showed net returns of 2.1 cents per pound. Twenty-nine lots better than average in only one factor showed negative net returns of 4.7 cents per pound. The closer a producer comes to being better than average in all factors the greater will be his net return.

CONCLUSION

The production of broilers in Utah has steadily increased in the last few years. Its expansion in the future will depend on its profitableness as a farm enterprise. There are a number of factors that influence the profitableness of broiler production. It is reasonable to conclude that some factors contribute more to success than others but no one can be singled out as a sole prerequisite since each interacts upon the others.

The most successful enterprises had larger than average lots, for net returns increased as the size of the lot increased. Within the scope of this study the maximum size of a broiler enterprise in Utah was not encountered. Lots starting with an average of 7143 birds showed net returns of 1.7 cents per pound but the point was not reached where net returns decreased as the size of the lot increased. Since the maximum size wasn't reached, increasing the number of birds started per lot appears to be a way broiler enterprises may become more profitable in Utah.

Greater feeding efficiency would offer a possibility for broiler production to become more profitable. Ways feeding efficiency might be improved are numerous.

First, it is recognized that the quality of chicks affect the rate of growth, as well as efficient conversion of feed to pounds of broiler. Great strides have been made in the breeding of suitable chicks for broiler production and continued advancement along this line will be necessary if broiler enterprises are to be successful.

Second, the management practices and feeding programs followed

will influence the operator's chances of marketing his birds with less feed per pound of broiler raised. Poor feed conversion may have been caused by defective feeders, filling feeders too full or some other poor feeding practice, by producing weak or diseased chicks, improper housing, ventilation and such considerations. Producers may increase their feeding efficiency by following better feeding programs as advocated by feed manfacturers, poultry specialists, and the successful broiler producers. Management and feeding programs are entirely under the control of the grower and the practices he uses will determine to a large degree his success in production.

Third, the compounding of the feed formula and the combining of feed into a ration will affect the feeding results obtained. Mash supplemented with large quantities of scratch may fail to meet the nutritive requirements of broilers and tend to unbalance the ration. Some feeds give better results than others, which indicates that formulas for the ingredients of broiler mashes do vary and that feed manufacturers should be constantly alert to develop better broiler mashes. The present level of all these factors might be improved through continued research and experimentation and result in efficiency and thus bring greater returns from broiler raising.

Success in broiler raising is associated with a low death loss. Death losses may be influenced by various brooding and management practices. Therefore the type of heat used, the square feet of floor space per bird, feeder space per bird, the number of chicks per stove, watering facilities, and the type and use of litter, proper ventilation and sanitation practices, and other management practices may decrease death losses and make an enterprise more profitable.

The more efficient use of labor appears to offer an opportunity to reduce costs and bring greater returns. It is evident that labor costs per 100 birds can be cut by increasing the size of the lots since the point was not reached in this study where returns decreased with lower labor requirements. The installation of labor-saving equipment such as automatic feeders and waterers, etc., may also cut costs and increase returns where the increased costs of capital is less than the cost of labor. Proper and convenient arrangement of buildings, pens, supplies and etc. also offer opportunities for increasing labor efficiency.

Costs tended to increase as birds were held to heavier weights. Successive inputs of feed after birds reached a certain age and weight were not proportionate with production of pounds of broilers. It is purported by some researchers that the growth curve for broilers turns downward after a certain period of time and that continued feeding after this age and weight is reached does not bring proportionate production results. Management practices that when followed will produce early and rapid development of broilers are highly desirable.

One of the greatest contributions to success is a high level of efficiency in all phases of production. Producers that want to be successful will need to give detailed attention not to just one factor but all factors of production in growing broilers.

The future of the broiler industry in Utah hinges to a great extent upon its comparative advantage as a broiler producer. Broilers produced in this state are generally consumed in the intermountain area. The expansion of the industry will depend on: (1) Increased consumption of broiler meat in the local consuming areas, (2) The development of market outlets in other areas of the country.

Consumption per capita of broilers in the nation is estimated to be 15 pounds, which the industry feels is way short of what should be expected. It is estimated that per capita consumption of chicken including broilers in the Western States is only two-thirds to three-fourths as high as the United States average. Therefore, increased consumption of broilers through advertising, the availability of broilers on a year-round basis in fresh non-frozen or quick frozen form, and other methods afford opportunities to increase consumption and expand the production of broilers in Utah.

The development of outside-the-state market outlets appears to be an opportunity for expansion of the Utah broiler industry. This state compares favorably with other states in broiler production (Appendix table I.). As noted from 1944 to 1952 greater efficiency in the production of broilers developed gradually. While data are not strictly comparable, Utah producers seem not to be at any particular disadvantage when compared to producers in other areas. Utah has achieved certain advantages in cost and other factors which may assist the broiler industry in its competing with other areas in the development of the new market outlets.

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APPENDIX

Appendix table I.- Broiler production data from various states.

State	Year study ended	Lb. Feed per lb. broiler sold	Percent death loss	Number started per lot	Age sold days	Average weight sold	Hours labor per 1,000 birds started	Total costs per lb.	Total receipts per lb.	Net returns per lb.
Maine	1944	4.5	11.5	1,956	102	3.9	—*	24.3	29.1	4.8
West Virginia	1945	4.4	12.3	1,688	97	3.3	77.4	25.0	29.4	4.4
Delaware	1946	4.7	12.5	13,170	105	3.1	101	29.0	34.6	5.6
Virginia	1947	4.4	10.3	1,935	95	3.2	167.0	31.5	31.6	0.1
Indiana	1947	3.7	10.9	6,100	86	2.89	89	33.7	35.3	1.6
Virginia	1948	4.0	9.5	2,749	88	3.08	97.3	32.4	36.3	3.9
Maryland	1948	4.05	11.32	7,890	93	3.06	—*	—*	—*	—*
Delaware	1949	3.9	16.1	12,222	95	3.1	73	31.2	31.8	0.6
Utah	1952	3.4	6.1	3,266	82	3.1	98	30.9	30.6	- 0.3

* Data not available.

BROILER ENTERPRISE SURVEY

#462

Utah Agricultural Experiment Station
Department of Agricultural Economics and Marketing
Logan, Utah

Record No._____

1951 year_____ to _____

Operator_____ Post Office_____

Sheet No._____ County_____

COMBINATION OF ENTERPRISES, 1951:

Crop Production		Livestock Production	
Crop	Acres	Kind	Average Number
Alfalfa:		Dairy cows	
		Other dairy	
		Beef cattle	
Grains:		Beef fattening	
		Sheep	
		Lambs fattening	
Contract crops:		Hogs	
		Hens	
		Pullets raised	
Fruit:		Broilers	
TOTAL		Turkeys raised	

Non-farm Employment (kind of work, period of year, and hours per day)_____

BROILER ENTERPRISE, 1951:

ITEM	SPRING	SUMMER	FALL	WINTER
Batch/es raised last year (✓)				
Reason for not raising additional batches in past year				
Changes in number of chicks ordered (if any)				
Reasons for changing order				
Was suitable credit available as needed?				
Was market contract available as needed?				

Specific program followed in producing broilers. (Describe practices.)

In your opinion, what needs of the broiler industry are not being served?

As of now, what are your plans regarding broiler production?

Was credit used for broiler production in 1951? Yes ☐ No ☐

If yes—

Batch	Source of Credit	Amount Borrowed	Time Used	Interest Rate	Other conditions

Other:

BATCH SUPPLEMENT

Broiler Enterprise Survey

Utah Agricultural Experiment Station
Department of Agricultural Economics and Marketing
Logan, Utah

Operator _____ Batch Letter _____

LAND, BUILDINGS, AND EQUIPMENT INVENTORY*

Item	Size	Age	Begin. Value	Pur-chases	Repair	Deprec-iation	Ending Value	Avg. Value	Charge to this batch			
									Percent	Value	Repairs	Deprec.
Range												
Coops												
Storage												
Brooders												
Mixers												
Feeders												
Waterers												
Wire												
Total	XX	XX							XXX			

*Inventory only those items used for broiler production.

#463

LABOR RECORD

Operation	Operator		Family		Hired		Total	
	Hours	Value	Hours	Value	Hours	Value	Hours	Value
Procuring:								
Chicks								
Feed								
Supplies								
Preparing Brooder								
Unboxing Chicks								
Brooding:								
Daily Routine								
1-4 weeks								
5-8 weeks								
9-12 weeks								
Mixing Feed								
Removing Litter								
Adding Litter								
Clean-up After								
Marketing:								
Locating Buyer								
Crating and Loading								
Hauling								
Miscellaneous								
Total								

Convert children's labor to man hours on the following scale: 16 and over equals 1 man; 15-16 equals 7/8; 14-15 equals 3/4; 13-14 equals 5/8; 12-13 equals 1/2; 11-12 equals 1/4. If because of the nature of the operation a boy under 16 years is just as productive in performing all of the requirements of that operation, the rate may be adjusted.

NOTE: Daily Routine means filling feeders, waterers, tending brooder, adjusting ventilation and such operations. If litter is added or removed daily, include the labor here under "Daily Routine". Be sure to avoid duplications.

FEED RECORD

Kind	Amount (Cwt.)	Cost per Cwt.	Cost per Ton	Total Cost	Manufacturer and Description
All Mash					
Mash					
Scratch					
Other					
Total					XXXXXXXXXXXXXXXXXXXXXXXXXXXX

PRODUCTION RECORD

Started			No. Died	No. Eaten	No. Sold	Breed and Strain	Hatchery
Date	Number	Cost					
Total						XXXXXXXXXXXXXXXXXXX	XXXXXXXXXXXXX

SALES RECORD

Grade	Date	No.	Pounds	Price	Value	Buyer
Total	XXXXXXX					XXXXXXXXXXXXXXXXXXXXXXXXX

MATERIAL COSTS

Kind	Time	Amount	Total
Fuel			
Electricity			
Water			
Litter			
Temporary Feeders			
Medicine and Vet.			
Total	XXX	XXXX	

RECEIPTS

Item	Amount	Price	Total
Pounds Broilers Sold			
Pounds Home Use Broilers			
Sacks Returned			
Rebates			
Used Litter			
Total	XXX	XXX	

SUMMARY

OVERHEAD EXPENSE	
Item	
Interest on operating money	
Interest on capital investment	
Deprec. and repair to capital	
Taxes (_____total)	
Fees	
Insurance	
Rents	
Miscellaneous	
TOTAL OVERHEAD EXPENSE	

RECEIPTS, EXPENSES, AND NET RETURNS	
Item	
Total Receipts	
Expenses:	
Chicks	
Feed	
Labor	
Materials	
Overhead	
Total Expenses	
Net Returns	

EFFICIENCY FACTORS	
Item	
Total chicks started	
Chicks sold or used at home	
Percent death loss	
Pounds of feed fed	
Pounds of chicken raised	
Feed fed per pound of gain	
Total cost of feed	
Feed cost per pound of chicken raised	
Feed cost per chick raised	
Total man hours of labor	
Hours of man labor/100 chicks raised	
Percent labor hired	
Average pounds per chick raised	
Age of chicks when sold	
Capital investment per chick raised	
Total Receipts	
Total Receipts per Chick Raised	
Total Receipts per Pound Raised	
Total Expenses	
Total Expenses per Chick Raised	
Total Expenses per Pound Raised	
Net Returns	
Net Returns per Chick Raised	
Net Returns per Pound Raised	

INTEREST ON OPERATING MONEY

Item	Amount	Time	Factor	Charge
Chicks				
Feed				
Labor				
Materials				

_____ (Enumerator) _____ (Date)

_____ (Field Check) _____ (Date)

_____ (Summary) _____ (Date)

_____ (Summary Checked) _____ (Date)