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OUR CHANGING POULTRY ENTERPRISE

AND ITS RELATION
TO DAIRY CATTLE AND HOGS



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in cooperation with

U. S. Department of Agriculture-Bureau of Agricultural Economics

Our Changing Poultry Enterprise

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INTRODUCTION

MANY CHANGES have taken place in the poultry enterprise during recent years. Some of them have been rather spectacular. Better breeding, better feeding and care, and better disease control have resulted in a large increase in the number of eggs laid per hen and in an increase in the average size of farm flocks. Whenever possible, farmers should make full use of these improvements in poultry production to increase their farm incomes. It is equally desirable, however, that they do not allow their enthusiasm for poultry to cause them to overlook the opportunities available to them in other forms of livestock. As only about five per cent of the farmers get as much as half of their income from poultry, it is evident that poultry is customarily found in combination with other farm enterprises. Usually, the livestock combination includes poultry, cattle, and hogs.

The problem of whether to increase or decrease poultry either in actual numbers or in relation to competing enterprises is a complex one. Many of the factors that need to be considered are general in nature and apply to farms generally. Others are limited in nature and apply differently on different farms. In this study no attempt was made to cover the whole range of factors that are involved in the proper choice of alternatives by any individual farmer.

The purpose of the study is to bring together the available data which show the experience of a group of farmers over a period of years with poultry, hogs, and dairy cattle. Attention is cen-

tered on the interrelationships of enterprises, points of conflict, and points of independence. From the analysis what has been taking place it may be possible to make suggestions which will be helpful to farmers in making their own decisions and to other workers in the field in getting a better understanding of what is taking place on Minnesota farms.

Data for the study come from two main sources: (1) farm records kept by farmers in the Southeastern Minnesota Farm Management Service; and (2) a special farm survey covering practices in poultry production. Records of the Southwestern Minnesota Farm Management Service were examined

also but data from them are not shown because, by and large, they add nothing new to the analysis. The farms included in the Farm Management Services are somewhat larger than the average and are probably somewhat better managed. The survey covered about 150 farms chosen at random throughout the southern third of the state.

duction per farm since the early thirties. How these changes compare with the changes in hog and butterfat production also are shown in table 1.

By valuing the products at their 1935-39 average prices, we get a common value measure for all of them. The percentage of the combined income from eggs, hogs, and butterfat that is attributable to each brings out the relative changes that have taken place. The changes are the result of changing volume of production and are not influenced by changing price. The percentages show that egg production has increased more rapidly than hog or butterfat. Poultry have been assuming a more important role in farm livestock production. Production of hogs likewise has tended to become relatively more important although the change has been less pronounced. Butterfat, however, has failed to hold its relative importance.

Table 2 gives a good indication of how these production changes came about.

Table 1. Production per Farm of Eggs, Hogs, and Butterfat, and Proportion of Income from Each When Valued at 1935-39 Average Prices on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Production per farm			Per cent of income when valued at 1935-39 prices from:		
	Eggs	Hogs	Butterfat	Eggs	Hogs	Butterfat
1932	number	pounds	pounds	per cent	per cent	per cent
1932	17,319	14,796	4,368	9	41	50
1933	22,066	13,170	4,544	12	36	52
1934	22,420	12,013	4,508	12	34	53
1935	22,176	9,801	4,013	14	32	54
1936	23,959	12,786	4,374	13	36	51
1937	24,871	12,768	4,083	14	37	49
1938	25,230	14,988	4,464	13	39	48
1939	22,281	16,425	4,140	11	44	45
1940	25,781	17,570	3,984	13	45	42
1941	27,970	20,203	4,051	13	48	39
1942	31,809	24,393	4,117	13	51	36
1943	36,061	25,071	3,903	14	52	33
1944	39,388	20,275	3,881	17	46	36
1945	41,426	18,570	3,996	18	43	38
1946	41,276	15,330	4,112	20	38	42
1947	41,577	17,656	4,392	18	40	41
1948	40,818	19,215	4,368	17	43	40

¹ Bureau of Agricultural Economics, USDA.
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Table 2. Numbers of Hens, Milk Cows, and Litters of Pigs per Farm and Production per Hen per Cow, and Number of Pigs Raised per Litter on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Hens per farm	Eggs laid per hen	Milk cows per farm	Production of butterfat per cow	Litters of pigs	Pigs weaned per litter
	number	number	number	pounds	number	number
1932	165	106	18.2	240	11.0	5.9
1933	187	118	18.7	243	12.0	5.8
1934	190	118	19.1	236	7.4	6.3
1935	171	131	17.6	228	7.4	6.3
1936	183	131	18.0	243	9.5	6.4
1937	192	130	17.6	232	9.2	6.3
1938	187	135	18.6	240	11.7	6.7
1939	177	126	17.2	245	12.0	6.3
1940	197	131	17.1	260	12.4	6.3
1941	197	142	17.4	261	14.3	6.3
1942	219	146	18.1	253	16.0	6.3
1943	246	147	17.5	247	18.0	6.0
1944	250	157	17.9	237	12.0	6.1
1945	247	168	17.3	254	13.0	6.3
1946	240	173	16.7	266	10.6	6.5
1947	239	177	16.9	281	12.9	6.2
1948	230	179	16.7	284	14.2	6.4

Increases in egg production came both from increased numbers of laying hens per flock and from greater numbers of eggs laid per hen. These two factors combined greatly increased the egg production per farm.

In hog production most of the change resulted because litter numbers were changed and market weights for hogs were varied. The number of pigs weaned per litter has shown little change during the years since 1932. Although production of butterfat per cow has been substantially higher since 1940 than before, the effect on production has been offset by a smaller number of milk cows per farm.

Income and Prices

Income from poultry relative to the income from hogs and butterfat has not increased despite the increase in poultry production.

Table 3 shows that the income received from the sale of chickens and eggs has increased greatly on southeastern Minnesota farms since the depression years of the early 1930's. The

change has been from about \$300 in 1932 to \$1,700 in 1948. Similar changes however, have taken place in income from hogs and dairy products and in the total cash receipts received from all sources combined. The result is that in spite of the increases in size of flocks, number of eggs paid per hen and price received for eggs, the proportion of the farmer's income which has come from poultry has increased very little, if at all. Poultry accounted for only 11 per cent of the farm income in the three years 1946-48. This is the same proportion that it provided in 1932-34 when the study was begun. During most of the intervening years the proportion provided by poultry was lower.

Hogs have become increasingly important as a source of income in this area. While they accounted for about one-fifth of the income before the war in 1948 they accounted for about one-fourth. Dairying generally accounts for about one-third of the total income of these farmers and is the largest source of income. Despite shifts from selling butterfat only to selling whole milk

Table 3. Cash Receipts from Poultry, Hogs, and Dairy Enterprises and Percentage from Poultry, Hogs, and Dairying on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Cash receipts			Per cent of total farm receipts from:		
	Poultry and eggs	Hogs	Dairy cows and dairy products	Total cash receipts	Poultry and eggs	Dairy cows and Hogs dairy products
dollars						
1932	296	502	1,106	2,754	11	18 40
1933	327	510	1,164	2,936	11	17 40
1934	427	603	1,396	4,182	10	15 33
1935	514	793	1,623	4,799	11	17 34
1936	518	1,198	1,869	5,889	9	20 32
1937	518	1,204	1,909	5,964	9	20 32
1938	514	1,248	1,769	6,136	8	20 29
1939	375	926	1,432	5,091	7	18 28
1940	485	984	1,943	5,948	8	17 33
1941	646	1,778	2,327	7,479	9	24 31
1942	972	3,104	2,953	10,005	10	31 30
1943	1,323	3,551	3,311	10,795	12	33 31
1944	1,342	3,168	3,960	11,381	12	28 35
1945	1,607	2,573	4,384	11,426	14	23 38
1946	1,518	2,863	5,307	12,936	12	22 41
1947	1,643	4,362	5,609	15,947	10	27 35
1948	1,708	4,222	6,565	17,188	10	25 38

the enterprise has shown indications of slipping downward as a relative source of income.

The income derived from each of the farm enterprises is made up of two elements: (1) the quantities produced and sold; and (2) the prices received for the product. From the foregoing discussion it is apparent that the relative incomes received from poultry, hogs, and dairying have not followed the same pattern as the relative changes in production. Hence, it is desirable to examine prices in order to discover the influence that they have had.

All prices went up sharply after 1940 (table 4). Prices of eggs, however, increased less than those of either hogs or butterfat. This is shown by the fact that it took more eggs to equal in value a hundred pounds of hogs or a pound of butterfat in the later years than in the earlier ones. Whereas in 1935-39 42 dozen eggs equalled 100 pounds of hogs in value, it took 52 dozen in 1948 and 59 dozen in 1947. Likewise, 1.8 dozen eggs during 1935-39 and 2.5 dozen in 1948

equalled one pound of butterfat in value. Except in 1942 and 1947, the relationship of butterfat to hog prices was high when compared with their 1935-39 prewar relationship.

Among farmers who had a choice between raising more hogs, adding a dairy cow, or increasing the size of the poultry flock, those who chose poultry probably did so for reasons other than price advantage.

Thus, it becomes apparent that egg production has increased steadily, both in actual volume and relative to competing livestock, in spite of the fact that egg price increases have been less than price increases for hogs and butterfat. In other words, relative prices of eggs have been less and less favorable when compared with those of hogs and butterfat. With eggs the farmer has obtained his increased income largely through greater production, while with hogs and butterfat he has obtained it largely (though not solely, in the case of hogs) through higher prices from these products.

Table 4. Prices and Price Ratios of Eggs, Hogs, and Butterfat on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Average annual price received by farmers			Number dozen eggs to equal value		Number pounds of butterfat equal in value to 100 pounds hogs
	Eggs per dozen cents	Hogs per hundredweight dollars	Butterfat per pound cents	100 pounds hogs dozens	1 pound butterfat dozens	
1932	13	3.18	22	24	1.7	14
1933	12	3.42	22	28	1.8	15
1934	15	4.01	28	26	1.8	14
1935	22	8.73	33	31	1.5	26
1936	20	9.26	37	46	1.8	25
1937	19	9.47	39	50	2.0	24
1938	18	7.69	31	43	1.7	25
1939	15	6.17	28	41	1.9	22
1940	16	5.27	33	32	2.0	16
1941	22	9.20	39	42	1.8	24
1942	29	13.24	44	46	1.5	30
1943	36	13.88	62	39	1.7	22
1944	32	13.08	74	40	2.3	18
1945	37	14.24	83	38	2.2	17
1946	35	17.23	102	49	2.9	17
1947	42	24.54	94	59	2.2	26
1948	43	22.95	109	54	2.5	21
1935-39	19	8.26	34	42	1.8	24

Introducing Costs

Thus far the discussion of the place and importance of poultry in the farm organization has been solely in terms of gross income, numbers, and physical production per unit. Cost, however, is also an important part of the picture. The same gross return from two or more enterprises may not mean the same net return or profit if their costs are different. The three big items in the cost of poultry, dairy cattle, and hogs are feed, labor, and a miscellaneous group which includes housing, veterinary fees, etc. It should be borne in mind that the relative proportions of feed, labor, and other costs differ considerably among poultry, hogs, and dairy enterprises. This is illustrated by the rough distribution of costs shown in table 5. These percentages are based on cost rates prevailing during 1941-45.

Since feed costs are 83 per cent of total costs for the hog producer, he is more interested in the feed costs than is the dairyman whose feed costs are

only half his total costs. On the other hand, about one-third of the dairyman's costs are labor and, hence, he is more sensitive to wage changes than the hog producer, especially with respect to hired labor. It should be pointed out that as the relative costs of feed and labor change, the percentages shown in table 5 also will change. The different enterprises, however, are likely to bear about the same relationships to each other as these relationships are due to different relative inputs of feed and labor that go into their production.

Table 5. Distribution of Total Costs of Producing Poultry Products, Hogs, and Butterfat Among Feed, Labor, and Other Costs, Nicollet County, Minnesota, 1941-45*

	Feed	Labor	Other
	per cent		
Poultry	66	21	13
Hogs	83	9	8
Dairy	50	34	16

* Adapted from Report No. 158 (mimeographed) University of Minnesota, Division of Agricultural Economics.

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Feed Use, Feed Inputs, and Cost

Looking at the problem from an accounting viewpoint, feed is a cost of production. From the viewpoint of a farmer who grows his own feed, however, livestock is just a convenient and profitable way to market his feed, labor, and capital combined. He is interested in choosing that form of livestock which will bring him as much money as possible for the feed, labor, and capital that he puts into them. Even when the farmer buys feed, he is still hoping to make a profit over the purchase price as well as to get a return for his labor. Likewise, when he hires labor, he hopes to make some profit above wages as well as a return for his feed input.

The quantity of grain per farm which was fed to hens by farmers in the Southeastern Minnesota Farm Management Service increased from around 20 thousand pounds in the early 1930's to about 34 thousand in the years since

Table 6. Total Concentrates Fed per Farm to Hens, Hogs, and Dairy Cows on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Concentrates fed per farm to:		
	Hens*	Hogs	Dairy
		hundredweight	
1932	180	660	356
1933	212	676	372
1934	211	490	283
1935	196	433	193
1936	221	573	287
1937	197	561	340
1938	237	692	356
1939	210	700	343
1940	234	797	301
1941	260	946	324
1942	276	1,211	332
1943	339	1,371	327
1944	352	1,034	325
1945	360	1,023	375
1946	343	849	377
1947	365	944	388
1948	297	943	385

* Includes feed consumed by the rearing flock.

the war (table 6). Large numbers of hens per flock and more feed fed per bird both have contributed to the increase. Grain fed to hens has more nearly equalled that fed to dairy cows in recent years. Hogs require far more grain than either hens or dairy cows. It is hogs that enable farmers to adjust livestock production to the year-to-year fluctuations in the corn crop. For this reason, hog production shows greater year-to-year fluctuations than egg or dairy production. From a biological viewpoint, it is as easy to vary year-to-year chicken numbers as hog numbers. Poultry requires little feed, however, and any large-scale attempt to use poultry to regulate the balance between livestock production and feed supplies would be likely to result in extreme fluctuations both in the supplies and prices of eggs and chicken meat. It would also cause bothersome and expensive housing problems and greatly disrupt the allocation of available labor.

Changes in amounts of feed fed per egg, per pound of butterfat, and per 100 pounds of hogs have been significant. They measure efficiency in the use of feed for the different kinds of livestock. Any changes in relative efficiencies are likely to result in changing the relative competitive position that each product has with the others. One reason that production of eggs has increased steadily in the last decade and a half, in spite of prices which have been low relative to hogs and dairy products, has been the increasing efficiency in the use of feed by poultry. Whereas it took more than a pound of grain to produce an egg in the early 1930's, it took only about three-quarters of a pound in 1948 (table 7). The quantity required has been dropping steadily throughout the period. Better chicks, provided more universally by hatcheries, better feeding practices and care, and successful efforts to minimize disease all have helped to reduce required quantities of grain.

Table 7. Concentrates Fed and Feed Cost per Egg, per 100 Pounds of Hogs, and per Pound of Butterfat. Southeastern Minnesota Farm Management Service, 1932-48

Year	Per egg		Per hundredweight hogs		Per pound butterfat	
	Concentrates	Cost of feed*	Concentrates	Cost of feed	Concentrates	Cost of feed†
1932	pounds	cents	pounds	dollars	pounds	cents
1932	1.09	.81	486	3.14	8.14	17.3
1933	1.01	.99	490	2.83	8.18	14.2
1934	1.00	1.25	464	4.71	6.28	19.2
1935	.93	1.29	495	5.54	4.82	22.1
1936	.96	1.40	489	6.27	6.56	18.0
1937	.82	1.40	480	6.33	5.87	22.1
1938	.96	.96	477	3.86	7.97	17.0
1939	.98	.98	464	3.51	8.28	15.8
1940	.92	1.04	480	4.11	7.98	16.9
1941	.94	1.27	494	5.17	8.38	18.9
1942	.88	1.55	516	7.16	8.40	23.3
1943	.94	2.06	564	10.21	8.76	31.8
1944	.89	2.18	560	10.93	7.72	44.6
1945	.81	2.12	557	9.97	9.38	37.5
1946	.82	2.38	558	12.77	9.17	40.3
1947	.87	3.12	452	17.99	8.94	50.7
1948	.73	2.67	501	15.04	8.93	50.0

* Includes feed fed to chicks as well as hens.

† Includes roughages and pasture.

On the other hand, the quantity of feed required to produce 100 pounds of hogs has tended to increase sharply. It took about 480 pounds of grain in 1932-34 to produce 100 pounds of hogs and 534 pounds in 1946-48. This is more than a 10 per cent increase. Reasons for this increase are not readily apparent. During the war the tremendous increase in demand led farmers to feed hogs to heavier weights. The extra weight required a more than proportionate increase in feed. Then, too, farmers tend to feed more when feed supplies are plentiful than when supplies are short and high priced. This may partially explain the rise in some years. Finally, the feeding value of the corn crop varies from year to year, depending on its moisture content. During years when we have considerable soft corn, it takes more to produce a pound of gain. This also may explain a part of the increase. Increases in production of hogs took place despite these increases in feed requirements because the price of hogs rose more rapidly than the price of

feed and the prices of poultry or dairy products.

The result of these changes in feed input per unit of product show up clearly in the cost of the feed. It is true that the cost of feed per egg rose during the later years in spite of the lower feed input per egg because feed prices rose sharply. The increase, however, was less than that of either hogs or butterfat. In other words, the changes in feed requirements have tended to reduce the relative feed cost of producing eggs as compared with hogs or butterfat. When one enterprise gains in efficiency relative to others with which it competes, it usually results in increased production of that enterprise. The increase is made at the expense of the competing enterprises. When the market will not take the added production except at lower prices, however, much of the advantage may be shifted quickly to consumers of the product, and the farmer will get only a part of the grain. Apparently this is what has happened with eggs.

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Labor Is Important, Also

Labor is by far the biggest single element of cost apart from the cost of feed. A measure of the differences in labor requirements of poultry, hogs, and dairy cows are the hours of labor adapted from "work units," developed as a part of the analysis of farm records. They represent the average accomplishment of a farm worker during a 10-hour day when working on each of the enterprises under consideration. Labor requirements shown in table 8 are based on these work units. These data indicate that 45.5 hens, 33.3 hundredweight of hogs, and .71 dairy cows each require 100 hours of labor during the year. However, the quantities of grain required by these numbers of livestock differ widely. The hogs that would use 100 hours of labor would require almost 18,000 pounds of grain, while the hens would take about 6,500 pounds and the dairy cows only about 1,700 pounds.

The relationship between the feed and labor requirements for hens, hogs, and dairy cows may be illustrated in another way. Table 9 shows the quantities of grain and hours of labor that

were used to produce \$1,000 worth of product during each of the five years 1944-48. As an average for the period it took a little less than three-fourths as much grain to produce \$1,000 worth of poultry products as to produce the same value in hogs. However, it took twice as many hours of labor. It took 8,768 fewer pounds of grain and 177 more hours of labor. On the other hand, a dairy enterprise will provide \$1,000 income with only about 40 per cent as many pounds of grain as is needed by poultry. Dairy cows, however, require more than half again as many hours of labor. In addition, they require considerable quantities of other feeds besides grain.

The fact that hens, hogs, and dairy cows differ widely in their relative requirements for feed and for labor is an important factor in determining which of the enterprises a farmer will expand or contract under changing conditions. There are two different types of effects.

The first effect is to furnish a market for labor by expanding a labor-consuming enterprise like dairying. Over a period of years, the products of a dairy cow have sold for prices high enough to provide a return over feed costs sufficient to provide a payment for the extra labor that the dairy cow requires. Hence, the farmer who has limited quantities of feed at his disposal but who has considerable labor available can make more money from his feed and labor combined by entering dairying rather than hog raising.

The second effect is to enable some farmers to increase greatly the size of their business by shifting to enterprises with low labor requirements such as raising hogs. A given number of hours of labor can be combined with a much larger quantity of feed in hog production. The resulting product will bring more returns to the farmer who is in position to take advantage of it. Thus, the farmer with large supplies of feed

Table 8. Labor Used per Unit of Livestock, Units of Livestock That Can Be Handled with 100 Hours of Labor, and Grain Used for Livestock Handled with 100 Hours of Labor

Units of livestock	Labor per unit of live-stock	Live-stock handled with 100 hours labor	Grain required to feed livestock handled with 100 hours labor*
100 hens	220	45.5	6,497†
100 pounds of hogs	3	33.3	17,815
1 dairy cow	140	.71	1,683

* Grain requirements based on five-year average, 1944-48, southeastern Minnesota.

† Includes grain for chicks.

relative to his available labor finds it to his advantage to produce hogs rather than dairy products. The poultry enterprise is between the other two in its relative feed and labor requirements.

Returns Above Feed Costs

Changes in labor efficiency cannot be studied directly from available data. We can show the trends in returns, however, that farmers have received from livestock above the feed costs. A large part of these returns constitute the payment for labor performed in producing livestock products. In other words, if the cost of feed is subtracted from the income received from the sale of the product, the remainder is the return over feed cost. This return must cover all costs other than feed as well as any profit that may be made. As a large part of this return can be properly attributed to labor, trends in the return over feed costs may be expected to reflect changing returns to labor for each of the different livestock products. But they do not because the enterprises differ widely in labor inputs. Table 9 gives the data for returns over feed costs for hens, hogs, and dairy. Following 1940 all classes of livestock showed substantial increases above the prewar average returns. Hens reached their peak for the period in 1945, hogs in 1947, and dairy cows in 1948.

Table 9. Concentrate Feeds and Labor Required to Produce \$1,000 Worth of Product with Hens, Hogs, and Dairy Cows on Farms in Southeastern Minnesota
Farm Management Service, 1944-48

Year	Hens		Hogs		Dairy cows	
	Feed	Labor	Feed	Labor	Feed*	Labor
1944	pounds	hours	pounds	hours	pounds	hours
1944	26,902	420	42,784	229	10,515	742
1945	23,477	354	39,101	211	10,728	630
1946	23,371	357	32,364	174	8,540	490
1947	22,422	320	21,774	122	8,540	476
1948	17,810	301	21,800	131	7,351	406
Five-year average	22,796	350	31,564	173	9,135	549

* Concentrates only. In addition the cows received pasture and an average of 4,326 pounds of dry roughage and 6,718 pounds of silage.

Table 10. Return Over Feed Cost for Hens, Hogs, and Dairy Cows on Farms in Southeastern Minnesota Farm Management Service, 1932-48

Year	Return above 100 pounds of feed cost			Return above feed cost as a percentage of 1935-39 average		
	Per hen	Per hundred-weight hogs	Per dairy cow*	Per hen	Per hundred-weight hogs	Per dairy cow
1932	.81	—.56	17.78	72	—	35
1933	.75	.53	26.46	67	17	53
1934	.81	.96	29.82	72	32	60
1935	1.59	3.98	41.99	142	133	84
1936	1.07	3.17	62.25	96	106	124
1937	.83	2.48	52.56	74	83	105
1938	1.12	3.47	47.89	100	116	96
1939	.97	1.82	45.05	87	61	90
1940	.92	1.50	58.05	82	50	110
1941	1.66	5.41	71.65	148	181	143
1942	2.16	7.09	84.86	193	238	170
1943	2.55	2.90	93.27	228	97	186
1944	1.82	2.77	101.31	163	93	203
1945	2.66	4.26	125.85	237	143	252
1946	2.05	7.04	178.55	183	236	357
1947	1.34	8.19	153.06	120	275	306
1948	2.52	5.52	203.85	225	185	408

* Includes cost of roughage as well as grain.

sive hatcheries and to better care and feeding on the farms. The advantage that has risen from increased egg production per hen is due to changes in technology and in this way differs somewhat from the situation in dairying. Already it has resulted in some increase in the size of the poultry enterprise relative to hogs and dairy in spite of declining relative prices.

The return over feed costs for hogs varies more from year to year than for either hens or dairy. As feed cost is such a large proportion of the total cost in hog production, the relationship between the price of feed and the price of hogs is the major determining element. There is no evidence in the farm records that points to increases in efficiency in hog production that are comparable with those in hens. In recent years more feed instead of less is needed to produce 100 pounds of hogs. To maintain the competitive position that it now holds, in the face of this trend hog production must depend on the continuance of a favorable hog-feed

price ratio and a strong consumer demand for pork.

Taken alone, a measure based on return above feed costs provides no measure of relative returns between enterprises. Hens, hogs, and dairy cows are too dissimilar in size for direct comparisons among them. One way to overcome this difficulty is to consider the number of each that could be handled with 100 hours of labor. This gives them all a common measure in terms of labor input. Table 11 is based on the labor inputs previously discussed. It shows the returns above feed costs for that quantity of each class of livestock that could be handled with 100 hours of labor.

The advantage of the hog enterprise arising from the low labor input is clearly brought out in this table. Hog producers could pay for the much larger quantity of feed that the hogs utilize and have more money left over for 100 hours of labor put in than they would with either the poultry or dairy enterprise. However, they might not be able to put in very many 100-hour periods

Table 11. Return Above Feed Cost for the Number of Hens, Hogs, and Dairy Cows That Could Be Handled with 100 Hours of Labor and Returns From Hens and Dairy Cows as a Percentage of Returns From Hogs

Year	Return above feed cost from:			Hens and dairy cows as a percentage of hogs	
	45.5 hens	33.3 hogs	.71 dairy	Hens	Dairy
	dollars	dollars	dollars	per cent	per cent
1932	36.85	—18.65	12.62	193	106
1933	34.12	17.65	18.79	115	66
1934	36.85	31.97	21.17	54	22
1935	72.34	132.53	29.81	46	42
1936	48.68	105.56	44.20	46	45
1937	37.76	82.58	37.32	44	29
1938	50.96	115.55	34.00	73	53
1939	44.13	60.60	31.98	84	82
1940	41.86	49.95	41.22	42	28
1941	75.53	180.15	50.87	120	68
1942	98.28	236.10	60.25	90	78
1943	116.02	96.57	66.22	85	63
1944	82.81	92.24	71.93	40	54
1945	121.03	141.85	89.35	22	40
1946	93.27	234.43	126.77	62	79
1947	60.97	272.72	108.67		
1948	114.66	183.81	144.73		

on this basis without running out of feed or encountering some other obstacle. Such difficulties as diminishing returns to labor input or the maintenance of proper sanitation would stop them. The dairy and poultry enterprises were not far apart in the returns above feed costs for 100 hours of labor. In recent years, prices of dairy products have been enough higher than the prices of eggs to more than make up for the extra labor input that dairying entails. During the war years 1940-45, poultry paid a higher return over feed costs than dairy. It was during this period that poultry had its most rapid expansion. Since 1945 the relative price of eggs has dropped so that dairy has shown higher returns above feed costs.

Comparisons Based on Averages

The comparisons made of relative feed costs and labor inputs are based on averages for a group of farms. Farmers who deviate from these averages

may find their situations to be somewhat different. Farmers who are unusually efficient in poultry production but only average or below in efficiency in hog or dairy production probably would make more money with poultry. They might find further expansion profitable even at the expense of the hog or dairy enterprise. Furthermore, where the poultry enterprise does not compete with the other enterprises for the same feed and the same labor, it may add to the total farm business and total farm income. This is true when the farmer's wife or family provide the labor and when much of the feed for poultry is purchased.

The comparison a farmer must make in deciding whether or not to keep poultry (or to increase or reduce numbers) is a double-barreled one. First is the problem of whether or not his poultry enterprise will pay at least enough to cover the costs. Second, does it pay as well as competing enterprises that would use the same feed and the same labor?

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Feed That Does Not Compete

Whether grains fed are grown on the farm or are purchased as commercial feeds may make a difference in the size of the poultry enterprise. The total production of livestock produced with homegrown feeds is limited to the supply of feeds grown by the farmer. If he does not want to buy additional feeds, he may have to curtail a livestock enterprise in order to expand another. Sometimes the purchase of commercial feeds means a better balanced livestock ration. Purchased feeds usually cost more than homegrown and may increase feed costs on farms that do not grow their own. Some of the three livestock enterprises—poultry, dairy cattle, and hogs—use greater quantities of purchased feeds than others.

Data concerning commercial feeds are given in table 12. Farmers buy a larger proportion of commercial feeds for poultry than for either hogs or dairy cows. During recent years almost a third of all feed fed to chickens has been commercial feed. Chick starter and grower are very widely used in growing replacements while laying mashes have increased in popularity. A part of the popularity of commercial feeds for poultry is probably due to the com-

plex nature of a well-balanced ration, but in part is due to the convenience of obtaining them already mixed and ready for use. This is especially true on the many farms where the poultry enterprise is run by the housewife, who ordinarily does not do her own mixing. To the extent that feed is purchased for poultry and labor is provided by the family, the enterprise is not in close competition with hogs or dairy. The decision that determines the size of the enterprise should depend on whether the returns are greater than the costs. The problem of relative returns from competing enterprises is of secondary importance unless the labor could be used in the other enterprises.

Hogs use the smallest percentage of commercial feeds, while dairy is in an intermediate position. There is some indication that commercial feeds are being used more commonly by all three types of livestock.

Another type of feed that is largely noncompetitive is roughage. Although small amounts of hay and pasture can be utilized by poultry and hogs, by and large only dairy cattle (of the enterprises considered) can use roughages effectively. Hence, the farmer who produces large quantities of roughage feeds is not particularly concerned with the competition of either hens or hogs. He is committed to produce the types

Table 12. Concentrates Bought as Commercial Feeds for Hens, Hogs, and Dairy Cows on Farms in Southeastern Minnesota Farm Management Service, 1941-48

Year	Concentrates bought			Per cent of total grain that was commercial grain		
	Per hen	Per 100 pounds hogs	Per dairy cow	Hens*	Hogs	Dairy cows
	pounds	pounds	pounds	per cent	per cent	per cent
1941	28	17	172	21	4	8
1942	28	26	304	22	5	11
1943	32	30	216	23	5	10
1944	37	41	340	26	7	17
1945	46	44	446	31	8	19
1946	44	36	398	30	6	16
1947	45	40	439	29	7	17
1948	38	39	456	29	8	18

* Includes feed bought for chicks.

of livestock that will utilize his roughage feeds or to find a cash outlet for them. Furthermore, in utilizing what grain feeds he has, he must consider their use in conjunction with his roughage and not their use alone. Thus, on a farm where high-grade hay is available as a substitute for grain in the dairy ration it may be easier to take grain from the dairy cows to increase the size of the poultry flock than it would be on a farm where such hay is not available.

Labor That Does Not Compete

So far, this brief discussion of labor has been only in terms of hours required by the different classes of livestock. As the farm operator has a limited number of hours of his own time at his disposal, he attempts to use them for the combination of enterprises that will bring him the largest return. If the size of the business exceeds his own labor capacity, then he must draw upon other labor to carry it on. In this connection, the problem of available family labor becomes important. Of particular importance to the problem of the relative size of the poultry enterprise is the farmer's wife or grown daughter at home. The labor used in caring for the dairy and hog enterprises is usually provided by the operator himself, male family labor, or hired labor. The housewife seldom takes an active part. Her time and energies are usually not available for an expansion of these enterprises. With the poultry enterprise, however, this situation may be entirely different. In a random survey conducted on about 150 farms in southern Minnesota, data were gathered concerning those who did the work on the poultry enterprise.

The data shown in table 13 cover the major items of labor involved in the poultry enterprise. They are computed as an average for the year, although seasonal differences do exist. The farm-

Table 13. Distribution of Labor on the Poultry Enterprise Among Members of Farm Family

Job	Member of farm family			
	Operator	Wife	Operator and wife	Son, daughter, or other
per cent				
Feeding laying flock	35	40	18	7
Gathering eggs	9	63	12	6
Watering laying flock	36	40	16	8
Feeding chicks	21	66	8	5
Watering chicks	23	64	7	6

er's wife plays a very important role in the poultry enterprise. On two-thirds of the farms, she does most of the work of raising the chicks. On only about one-fifth of the farms were the chicks handled by the operator himself. Likewise, in gathering eggs the job fell to the wife in about two-thirds of the cases. This proportion is higher during the spring and summer when the operator is busy with field work and lower in the fall and winter when the operator has more time. Feeding and watering the laying flock was given as a job for the wife on about 40 per cent of the farms. In addition, another 16 to 18 per cent said the work was divided between the operator and his wife.

Jobs not listed, such as cleaning the hen house, moving brooder houses, etc., are generally done by the operator himself or by a male worker on the farm. It seems reasonable to assume that on perhaps two-thirds of the farms at least one-half of the labor used by the poultry enterprise is provided by the operator's wife, mother, daughter, or other family labor which may not be available to other farm enterprises.

On many farms this situation provides the poultry enterprise with a unique advantage. It enables the operator to expand his other enterprises including hogs and dairy, to about the full limit of his available time and en-

ergies. Then the family income can be increased still further by adding a poultry enterprise. This enterprise uses a combination of homegrown and purchased feed and it uses labor chiefly which is not available to other enterprises. This holds true, however, only so long as the enterprise is kept small enough to be handled largely by family labor. On those farms where the housewife takes over the management of the poultry flock as well as the major portion of the labor, the enterprise becomes somewhat independent of other enterprises on the farm. If she is a capable manager the enterprise may show better than average returns above feed costs and may readily compete on equal terms with hogs or dairy.

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The survey previously mentioned indicates that not all farmers are aware of this quality improvement work or at least that they do not take advantage of it. Of 149 farmers interviewed, 77 bought their chicks according to some sort of quality designation, 54 did not, and 18 did not reply to the question. The most commonly recognized type of quality designation was the 3A or 4A type. A number indicated that they picked their hatchery and ordered the "best." It is apparent that there is room for improvement in farmers' understanding of the grades of chicks they buy. When farmers demonstrate improved understanding by uniformly insisting on obtaining high-producing strains, the average production per hen will rise still further. As it takes little more time to feed and care for a good hen than a poor one, the average efficiency of the poultry enterprise should likewise be increased.

The use of lights in the poultry house depends largely on the size of the flock. Almost 83 per cent of all flock owners interviewed used lights during part of the year. However, less than half of the farmers with flocks of less than 200 hens used lights. Those with flocks of more than 300 hens almost universally used them. This would appear to indicate that only little more improvement can be expected from this source.

Built-up litter is a labor-saving practice that progressive poultrymen have advocated. Instead of changing the litter at frequent intervals, the new litter is put on top of the old. This practice saves considerable labor, especially the operator's. However, the use of built-up litter was still uncommon at the time of the survey. Only about 20 per cent of the farmers used built-up litter. More complete adoption would result in some saving of labor, although the change would not be of great importance. Perhaps its greatest value would lie in the fact that it is the operator's time that would be conserved rather than that of family help.

What Does It All Mean?

The trend in poultry production has been toward increasing efficiency. There seems to be no end to developments yet in sight.

With increased efficiency have come increased poultry numbers and greatly increased production since 1940. Consumers have responded by eating more eggs per capita, but only at lower prices relative to pork and dairy products. Hence, a part of the advantage of increased efficiency was quickly passed on to the consumer and not retained by farmers. The upward trend in efficiency is likely to continue regardless of price changes. Farmers cannot retrogress in efficiency without sacrificing income.

It appears likely that under the general economic conditions which prevailed from 1946 to 1950 poultry production expanded a little too far in relation to competing enterprises such as hogs and dairy. On the average, the same quantities of feed and labor devoted to either hogs or dairy paid better during 1946-50 than those used in poultry production. Thus, farmers have no general incentive to expand poultry at the expense of the other enterprises. In fact, some relative curtailment in poultry production would be necessary to bring poultry earnings in line with those of other products.

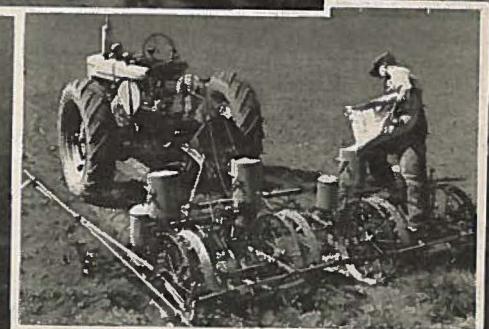
If general economic conditions become less favorable, the poultry enterprise probably would be in better shape to weather the storm than either the hog or dairy enterprises. This is because increased efficiency and lower costs in poultry production have made eggs and poultry meat relatively cheap food.

Although the average farmer has no general incentive to increase his poultry enterprise now, individuals may find the situation different.

- Farmers who are unusually efficient in poultry production but only average in hog or dairy production may find it profitable to expand their poultry enterprise even though it means curtailment of either or both of the other enterprises.
- Farmers who have family labor that is available for poultry but not for hogs or dairy may find that an expansion of poultry will add to their total net income.
- Some farmers may not have taken full advantage of improved production practices. By increasing their efficiency through adoption of these practices, they may put themselves in the above-average class.

Farmers face a two-fold problem. Their first concern is whether or not poultry production returns enough to pay the costs. But if they have other alternatives for the use of their feed and labor, they are also faced with the problem of whether poultry will pay as well as the alternatives.

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