

5-1-1966

## Cost study in producing milk for manufacturing purposes

B. C. Hurt Jr.

Mason Summrall

Follow this and additional works at: <https://scholarsjunction.msstate.edu/mafes-bulletins>

---

### Recommended Citation

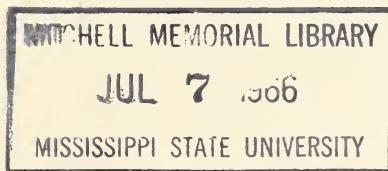
Hurt, B. C. Jr. and Summrall, Mason, "Cost study in producing milk for manufacturing purposes" (1966).  
*Bulletins*. 32.

<https://scholarsjunction.msstate.edu/mafes-bulletins/32>

This Text is brought to you for free and open access by the Mississippi Agricultural and Forestry Experiment Station (MAFES) at Scholars Junction. It has been accepted for inclusion in Bulletins by an authorized administrator of Scholars Junction. For more information, please contact [jshed@library.msstate.edu](mailto:jshed@library.msstate.edu).

# Cost Study In Producing Milk For Manufacturing Purposes

BY B. C. HURT, JR. AND  
MASON SUMRALL



Mississippi State University  
AGRICULTURAL EXPERIMENT STATION

HENRY H. LEVECK, Director



Cows on summer grazing at the Pontotoc station.

# COST STUDY IN PRODUCING MILK FOR MANUFACTURING PURPOSES

BY B. C. HURT, JR. AND MASON SUMRALL

There is a strong demand for milk for manufacturing purposes, but is the price received for this milk enough to justify the investment under the present economical conditions? This is the question raised by farmers today.

In 1957 there were 15,743 producers in Mississippi and by the end of 1962, the number had decreased 46.0 percent to 8,500. Production per farm has been increasing, but at a rate too slow to maintain supplies.

To attempt to answer some of these questions a controlled cost study was made at the Pontotoc Branch Experiment Station using a herd of grade Jersey and Holstein cows.

The original animals were purchased as heifers in 1955 and bred artificially during the entire period of the study. The sires used were the ones available to the northeast area of Mississippi.

When the study had begun in 1959, the herd consisted of 42 two-year-old heifers and mature cows that averaged 8,600 pounds of 4.2 percent butter fat milk per cow.

For the five-year period there was an attempt to maintain about equal numbers of Holstein and Jerseys, with a total of 40 milking cows. Some years the cow numbers dropped below 40; the average number during the five years was 38.6 cows.

The cows were milked by one man in a parlor type barn with two elevated stalls on each side of the center aisle. Four cows entered the parlor at a time, and with a two-unit machine, two were milked while two were being prepared. The milk went into calibrated jars, and after the weight was recorded it was conducted through a glass pipeline to cans in an adjoining milk room. A covered concrete pen is connected to the milk

parlor to hold the cows prior to milking.

A pole type shed was used for feeding hay and silage. The hay was stored in a barn, and the silage in a 175-ton capacity concrete trench silo.

## Pasture Program

The permanent and temporary pastures consist of approximately 70 acres located in the flatwoods soil area. Pasture practices described here conform to current recommendations. Permanent pastures, composed of Dallisgrass and white clover, were utilized from late winter through the summer months. The permanent pastures were established from wooded areas in 1954. Two tons of lime were applied to these pastures at five-year intervals. An annual application of 60 pounds of phosphorus and 60 pounds of available potash was applied. There was an excellent grass-clover combination for the first three years, however, with sub-zero weather in the winter of 1963, the clovers were reduced to about a 10% stand. Clover seed was applied in the spring of 1963 and stands were increased to 40% the last two years. During the entire test period Dallis stands were excellent and growth was considered adequate. Under ideal growing conditions these pastures provided enough forage for two cows per acre. However, through much of the summer after June 20 one acre would supply forage for only one cow. In dry periods the permanent pasture had to be supplemented with temporary grazing crops as millet.

Each year one-half acre of Starr millet per cow was planted in mid-May to supplement the permanent pastures. The millet was seeded at the rate of 20 pounds per acre and fertilized with 33 pounds of nitrogen and 40 pounds available phosphorus and potash at plant-



ing time. After the millet was well established an additional 33 pounds of nitrogen was applied.

The millet provided controlled grazing from the last of June until late August when the land was prepared for oat planting.

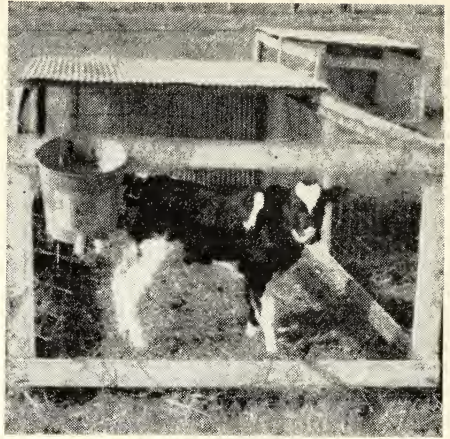
By the first of September, the area planted to millet was prepared for oat seeding. A recommended oat variety was sowed at the rate of 4 bushels per acre. The oats were fertilized with 50 pounds of available nitrogen, 60 pounds of available phosphorus and potash each at the time of planting. The oats were top-dressed with 33 pounds of available nitrogen in December and March if sufficient growth was made for fall grazing. The oats were generally large enough for grazing the last of October and provided controlled grazing through December. Most winters, cattle were removed from oat forage after January 1 until the last of February. Throughout the winter grazing period, the time the cows grazed oats each day depended on the amount of forage available. Hay was fed the entire winter period, but silage was fed only when grazing was limited or not available.

### Silage

Oats cut in the spring and millet cut in the summer were ensiled for feeding the dairy herd during the winter months. Both of these plants produced a good quality silage. This type silage constituted the larger part of the ration for yearling heifers and dry cows.

### Hay Feeding

Alfalfa was the principle hay fed to the milking herd while oat and lespedeza hay was substituted when alfalfa supplies were scarce. Hay was fed free choice throughout the winter, even when cows were on part time grazing. About two pounds of hay per 100 pounds of live-weight was consumed. Good quality hay



**Calves are raised in portable pens.**

helped maintain a high level of milk production when pastures did not provide adequate forage.

### Concentrate Feeding

Concentrates, composed primarily of home grown grains, were fed at the rate of one pound of grain for each three pounds of milk produced. Cottonseed meal or soybean meal, as the chief protein source, was added to corn and oats to provide a 13 percent protein feed. Five percent molasses and 1 percent salt were added to the above mixture.

### Raising Replacement Heifers

Since 1955, the Pontotoc Branch Station has been raising calves in portable pens. Over 150 heifers have been raised with no deaths or serious disease trouble. Success has been attributed to the use of 5' x 10' portable pens and the management practices followed.

At calving time the cows are kept outside in an area of pasture which is considered not to be heavily contaminated with disease producing organisms. After birth, the calves remain with their dams for at least 24 hours. Then the calf is placed in a portable pen. Oat straw or some other good bedding is kept in the pen at all times. Since colostrum milk is necessary for raising good healthy

calves, the dam's milk is fed for several days. Milk is fed twice daily in a nipple pail, and one pail is provided for each calf. The amount of milk fed is about 1 pound for each 10 pounds of body weight. This is increased with growth but never exceeds 12 pounds per day.

In addition to milk, the calves are fed a commercial calf starter, legume hay, salt and fresh water. Each calf has its own water pail, feed pail and hay rack. The calves begin eating the starter at 7-10 days of age. It is fed free choice and when a calf starts eating 2 to 2½ pounds of the commercial starter, the milk may be reduced or stopped completely at this stage without any ill effect. At two months of age the concentrate fed to the milking herd is added to the starter and at three months the commercial starter is left out. At five months, calves are vaccinated for brucellosis and blackleg and put in pasture with other calves. They are dehorned at an early age by using a paste or plastic dehorning compound.

The portable pens are placed 7 feet apart in a line at the lower end of the area to be used for raising calves. Once each week the pens are moved to fresh ground and new bedding is put in. They are moved uphill on a zig-zag course so as to utilize all ground area possible.

The pens are inexpensive and easy to build. The primary materials used are lumber (1" x 4"), net wire and an aluminum top for part of the pen. The roofing is needed for protection from rain, cold, or heat. Protection from wind on the north and west sides of the pen is furnished by plastic or some light-weight material. The pen can be easily disassembled when not in use.

The success of this system of raising calves can be attributed mainly to sanitation in feeding and the weekly movement of pens to clean ground.

### Management of Older Heifers

When the calves are taken out of the portable pens, they are kept in groups away from larger and older animals. Pasture provides the feed for these heifers and is supplemented with grain when the quality goes down in the late summer. As soon as winter grazing is available the heifers obtain the needed nutrients from this source.

In late winter, it is usually necessary to remove the heifers from the cereal crops. When this is done they are put into a lot with shelter and fed silage, hay and a concentrate of crushed corn cob and shuck meal and a protein meal. This grazing and feeding program is followed until the heifers are put into the milking herd. The thrifty heifers are bred to calve at the age of two years, unless this results in the calf dropped at an undesirable time. Others are bred according to their growth and development.

### Dry Cows

Pasture provides the major portion of the feed fed to dry cows. As long as good lush pastures are available dry cows will obtain their needed nutrients. When the quality of the pasture drops, the dry cows are fed a concentrate of crushed ear corn and protein meal. When grazing is not available, the dry cows are fed a ration of silage, hay and a concentrate of crushed ear corn and protein meal. The concentrate ration is usually mixed in a ration of 100 pounds of protein meal to 600 pounds of corn and fed in varying amounts according to roughage available.

### Financial Summary

During the five-year period analyzed, June 1, 1959—May 31, 1964 the herd averaged 38.6 cows two years old and older. Each year some cows were culled and young cows raised on the Station were added to the herd. Each year the

**Table 1. Annual returns to labor and capital for dairy operations at manufactured milk prices, Pontotoc Branch Experiment Station.**

Item	Average cost and return for 1959-1964 period		
	Herd	Per cow	Per 100 lb. milk
<b>Feed Cost:<sup>1</sup></b>			
Concentrates	\$ 4,231	\$110	\$1.15
Hay	1,367	35	.37
Silage	868	22	.23
<b>Total</b>	<b>\$ 6,466</b>	<b>\$167</b>	<b>\$1.75</b>
<b>Pasture Cost:</b>			
Fertilizer	\$ 901	\$ 23	\$ .24
Seed	206	5	.05
Land preparation, seeding, applying fertilizer and mowing	724	19	.20
<b>Total</b>	<b>\$ 1,831</b>	<b>\$ 47</b>	<b>\$ .49</b>
<b>Other:</b>			
Hauling and ADA	\$ 1,511	\$ 39	\$ .41
Veterinary and breeding	711	18	.19
D.H.I.A.	263	7	.07
Miscellaneous	483	13	.14
<b>Total</b>	<b>\$ 2,968</b>	<b>\$ 77</b>	<b>\$ .81</b>
<b>Total cost:<sup>2</sup></b>	<b>\$11,265</b>	<b>\$291</b>	<b>\$3.05</b>
Less cattle sales	2,788	72	.75
Less increase in inventory <sup>3</sup>	550	14	.15
<b>Cost of producing milk</b>	<b>\$ 7,927</b>	<b>\$205</b>	<b>\$2.15</b>
<b>Value of milk produced</b>	<b>\$12,915</b>	<b>\$334</b>	<b>\$3.50</b>
<b>Return to labor and capital</b>	<b>\$ 4,988</b>	<b>\$129</b>	<b>\$1.35</b>
Average milk production annually	371,963	9,636	
Percent butterfat	4.1		
Average cows milked	38.6		
Average price for 4.1% B.F. milk	\$3.50		

<sup>1</sup>Feed charged at market prices.

<sup>2</sup>Does not include a charge for the following: (1) labor, (2) interest on investment in land, cattle, buildings, equipment and fencing, and (3) depreciation on buildings, equipment and fencing.

<sup>3</sup>Cows were valued at \$225, 2-year-old heifers at \$175, 1-2 year-old heifers at \$125, and heifer calves at \$75.

cows in the herd varied, therefore, the average number milked during this period also varied.

In calculating feed cost, concentrates and hay were charged at the average prices paid by Mississippi farmers. Silage was charged to the dairy enterprise at approximately one-third of the cost of hay.

Pasture costs were calculated as follows: Seed and fertilizer were charged at the average prices paid by Mississippi farmers. Land preparation, seeding, applying fertilizer and mowing were charged at the usual custom rates. Pasture cost was reduced by the value of rough-

age harvested from the pasture acreage less the cost of harvesting.

Other costs were those paid by the Station for supplies and services used in the dairy operation.

The annual total cost amounted to \$11,265 for the herd and \$291 per cow. Feed and pastures were the most important items of cost. Concentrates accounted for 37.5 percent of total cost, roughage for 20 percent, and pastures 16 percent. The cost of producing milk was calculated by deducting the value of the cattle sold and increases in the cattle inventory from total herd cost. The annual cost of producing milk averaged \$205

per cow and \$2.15 per hundred pounds of milk.

The annual milk production amounted to 371,963 pounds of 4.1 percent butter fat milk for the herd and 9,636 pounds per cow. The annual value of milk produced amounted to \$12,915 for the herd. \$334 per cow and \$3.50 per 100 pounds.

Several factors other than milk pro-

duction aided in return to labor and capital. Yearly cattle sales amounted to \$2,788 and the inventory was increased \$550 annually. This decreased the cost of producing milk by 30 percent. The returns to labor and capital averaged \$4,988 for the herd, \$129 per cow and \$1.35 per 100 pounds of milk.

## APPENDIX

These costs and returns figures for a typical 30-cow herd were prepared by James G. Hamill and Verner G. Hurt, Experiment Station economists, to provide additional guidance for producers of milk for manufacturing purposes. They do not pertain to the Pontotoc herd.

Appendix Table 1. Manufacturing Milk: Estimated costs and returns per 30 cows, advanced technology (9500 pounds per cow—3.6% B.F.)

Item	Unit	Quantity	Price	Amount
Income				
Milk	cwt.	2,850.00	\$3.25	\$ 9,262.50
Livestock sales				1,128.00
Total				\$10,390.50
Expenses				
Cottonseed meal	cwt.	232.50	4.10	954.48
Salt	cwt.	9.31	2.00	18.62
Deflourinated phosphate	cwt.	9.31	3.33	31.00
Corn (ear corn)	cwt.	698.49	1.67	1,166.48
Grinding and mixing	cwt.	949.91	.30	284.97
Si'age (375 ton—custom harvest)	acres	25.00	57.46	1,436.50
Pasture (permanent)	acres	21.00	16.33	342.93
Pasture (temporary summer)	acres	30.00	21.20	636.00
Breeding and testing	herd			362.10
Hauling	cwt.	2,850.00	.20	570.00
Miscellaneous	cow	30.00	14.36	430.80
Total				\$ 6,233.88
Net returns over specified expenses				\$ 4,156.62
Less depreciation				2,786.00
Returns to land, labor, capital and management				\$ 1,370.62
Less 5% interest on average investment (\$26,814)				1,340.70
Returns to labor and management				\$ 29.92



Appendix Table 2. Estimated investment and depreciation for producing manufacturing milk per 30 cows, advanced technology.

Item	Number	Cost	Estimated life in years	Annual depreciation
Land (acres in crops and pastures)	76	\$11,400		---
Barn and milk parlor	1	3,100	20	\$155
Pipe line milker	1	1,200	12	100
Milk cleaning equipment	1	300	10	30
Bulk tank (400 gal.)	1	2,000	15	134
Silo (20 x 50)	1	3,890	25	156
Blower (silage)	1	800	5	160
Automatic feeding (including troughs)	1	1,917	10	192
Fence (3 miles @ \$640)		1,920	20	96
Deep well	1	1,000	10	100
Hot water heater	1	60	5	12
Tractor (2-row)	1	3,000	10	300
Disc harrow	1	1,000	10	100
Harrow (2 section)	1	100	20	5
Planter (2 row w/fert. attach.)	1	380	20	19
Cultivator (2-row)	1	240	12	20
Fertilizer distributor (10')	1	320	10	32
Mower (5')	1	600	12	50
Livestock (30 cows @ \$300)		9,000	4	1,125
Total		\$42,227		\$2,786

### Some points needing emphasis:

1. Custom harvest of silage must be available (possibly organized by the plant) if acreage is limited.
2. Bulk handling of milk is more economical, thus the necessity for a bulk tank.
3. Silage must be depended on as an annual feed as much as possible.
4. The additional investment will vary depending upon each individual farm.
5. Production level shown in appendix tables must be considered a minimum.
6. Financing should be accomplished mainly on the basis of the expected average life of each item.
7. Depreciation must be considered for those items which will be used up in the production process.
8. Interest on investment is particularly relevant for the present and additional investment financed by borrowing.