BULLETIN 368
JUNE 1966

Budgeted Costs of Producing Grade A Milk

BASED ON CONTROLLED FEEDING EXPERIMENTS AT THE PIEDMONT SUBSTATION, CAMP HILL, ALABAMA

Agricultural Experiment Station

AUBURN UNIVERSITY

E. V. Smith, *Director*
Auburn, Alabama

SUMMARY

The key to a successful dairy farm operation lies in following well-conceived plans based on best available information. Records of past dairy operations play an important part in providing data for use in plans or budgets for the future.

Present-day conditions – increasing dairy farm and herd size, higher producing cows, increasing costs, and other related factors – make it necessary that a dairyman choose the feeding system that is best suited to his operation. However, dairymen who have not used several feeding systems do not have the records needed to develop budgets for possible alternative feeding systems. The major purpose of this report is to present detailed comparisons among three different feeding systems that may be used as a guide by interested dairymen.

Primary data for this study were obtained from experiments conducted with the Grade A dairy of the Piedmont Substation, Auburn University Agricultural Experiment Station System, Camp Hill. The experiments covered a 5-year period beginning in 1958.

The Substation dairy herd was divided into two groups. One group of cows was fed stored roughages in drylot while the other was on hay and conventional pasture. Both groups were fed the same level of grain. Cows in one group for a full lactation period were assigned to the other group for their next lactation to reduce effects of individual cow differences.

Over the 5-year period, cows in drylot averaged producing 10,883 pounds of 4 per cent fat-corrected milk, as compared with 11,241 pounds for the pasture group. Both production records were on a calendar year basis. However, there were no significant differences in production on a calendar year vs. a lactation period basis. Likewise, the 3 per cent additional milk produced by the average cow on pasture was not statistically significant. The pasture group had slightly lower feed costs per hundredweight of milk produced 3 years out of the 5.

Based on the 5-year findings at the Piedmont Substation, plans or budgets were developed to estimate total costs involved in milk production, exclusive of land and management. Feed, labor, and all other costs were determined for three different dairy feeding systems: drylot feeding, pasture feeding, and a combination of the two. All three systems were budgeted for 60 cows weighing an average of 1,250 pounds, and producing 10,000 pounds of 4 per

cent fat-corrected milk. Feeding was based on 7,200 pounds of TDN per cow per year. This rate required the cows to be fed and managed at a high level of efficiency. Land used for the 60-cow herd, with 31 replacement heifers, for each of the three systems was as follows: drylot, 152 acres; pasture, 220 acres; and combination system, 175 acres.

Net returns to the 60-cow drylot system using stored roughages throughout the year were $9,279, as compared with $9,793 for the pasture system and $9,760 for the combination grazing and stored forage system. Net returns to land and management, under Piedmont soil conditions, were $515 greater for the 60-cow herd on the pasture system than for the drylot system, but only $33 higher than the combination system.

Total production costs per hundredweight of milk produced were $4.44 for the drylot system, $4.35 for the pasture system, and $4.36 for the combination method. These totals included all expenses normally included in cost accounting except for a land and management charge.

The drylot feeding arrangement used more total hours of labor for feed production and herd management than either of the other two systems. The least land was used in the drylot system. These differences would often influence a manager's choice of feeding arrangement to use. It is possible that an individual dairy farmer in the Piedmont would find the drylot system more feasible if there were excess family labor available or if land were limited.

Either of the three systems studied can be used profitably in the Piedmont area. Each dairy farmer must consider his situation relative to land, labor, capital, and managerial ability in deciding which method to use.

CONTENTS

FIRST PRINTING 3½M, JUNE 1966

Budgeted Costs of Producing Grade A Milk*

LARRY W. ROBERTS, *Research Assistant in Agricultural Economics***
E. L. MAYTON, *Superintendent, Piedmont Substation****
J. H. BLACKSTONE, *Professor of Agricultural Economics*
GEORGE E. HAWKINS, *Professor of Dairy Science*

INTRODUCTION

ALABAMA'S DAIRY INDUSTRY in recent years has been characterized by a decrease in number of dairymen, coupled with an increase in herd size of remaining producers. In 1958, there were about 1,700 Grade A dairymen in the State. By 1965, this number had decreased to approximately 1,250. During this period, 675 dairymen went out of business and 225 new producers entered the business. Herd size has increased from an average of about 40 cows to nearly 80 cows per farm. During the next 10 years the number of Grade A dairy farms may reduce to 1,000 or less, but with an average of 100 or more cows per farm. The increasing milk production per cow is expected to continue for the next several years. These expected changes make it important that dairymen consider alternative feeding systems.

Present-day dairymen are faced with problems of selecting combinations of feed production and utilization techniques, and systems or types of milk production and herd management that are best suited to individual farms and to the quality of cows in their herds. Dairymen may choose one of several ways of providing feed and managing their dairy herds. Each of the several

* The research project on which this report is based was financed by Federal-Grant funds (Alabama Hatch project No. 128) and by State Research funds.

** Resigned.

*** Acknowledgment is due J. A. Little of the Dairy Science Department, and Joseph Lott and John Sandy, formerly assistant superintendents of the Piedmont Substation, for their assistance in conducting the experiments on which this study is based.

feeding systems or management practices that may be used has different requirements for land, labor, capital, and management. Because of these variations, normally there will be differences in costs per cow and per hundredweight of milk produced.

Within limits, dairymen have several choices they may make in the system of milk production followed, the herd management practices followed, and the methods used for raising replacements. Also, they have a choice in the crops they produce, and in seeding, grazing, harvesting, and storage methods they use. These choices are influenced by the kind and intensity of dairy program followed; availability of pasture and cropland; complementary and competitive relationship of crops; and availability of buildings, equipment, capital, labor supply, and other factors. Personal preferences also play an important role in these choices. To consider all these variables requires planning, and a useful tool to the dairy farm operator as he plans ahead is the development of a budget.

The word "budget" ordinarily suggests a written detailed plan of farm operation. Budgeting, written or unwritten, is planning. The crux of a successful dairy farm operation under present-day conditions lies in following well-conceived plans. Records of dairy farm operations in the past play an important part in providing the data needed for making future plans. These records of past performance indicate some of the most dependable information available as to what the dairy farm operator may reasonably expect to accomplish in the future on his farm. Past farm records, however, do not always provide all of the information needed for planning. Especially is this true for a dairyman who has long used only one system of feeding his dairy herd, such as a conventional pasture system.

Dairy farm planning must be forward looking. Increases in dairy farm and herd size, higher producing cows, changes in prices and costs, and other related factors make it necessary that past feeding systems be considered in the light of future possibilities. This means, for example, that drylot feeding systems and combination feeding systems should be considered as possible alternatives to pasture feeding systems.

Research data should be used, in addition to farm records, as a guide in considering alternative feeding systems. Data in this report are presented in detail so that dairymen can make adjustments to fit their own situations before making comparisons among systems.

Production costs for Grade A milk are usually divided into three major groups – feed, labor, and all other costs. While a dairyman has some control over each of these, he is usually able to exercise his greatest control over feed and labor costs. Although production practices on most dairy farms are similar, some dairymen may be particularly efficient in crop production, some in feeding, and some in other production phases.

Forage production is a major enterprise on many dairy farms. A large proportion of the total investment required in dairying is associated with production, harvesting, and storage of forage crops. From an economic standpoint, each dairyman is interested in growing the kind and amount of forage that results in the most favorable net income. In attaining this, each dairyman must recognize: (1) the characteristics of his farm resources that remain relatively fixed in any given time period, (2) interrelated problems associated with production and use of forage, and (3) the costs and returns related to each alternative production method he might use.

Neither the proper level of feeding nor the best combination of feed in the ration can be determined separately. Level of total feeding depends, in part, on the combination of feeds used, and the combination may depend, in part, on the level of feeding.

Labor and all other costs are important in the economic framework of determining the best level of production. Each dairyman must consider these costs in terms of his total system. It is fortunate that most dairymen have a range of choices that may be used.

The original objectives of this study were to determine physical and economic data on different feeding systems using a high producing dairy herd. This specific report considers, through the use of budgets, all costs except management and land for a well managed 60-cow Grade A dairy herd. All crop production and herd management practices follow current recommendations of the Agricultural Experiment Station. Practices are at a level obtainable by most Alabama dairymen. Detailed data provided may be used as a guide in developing one or more budgets for an individual dairy farm.

PROCEDURE

Records for planning or budgeting the three feeding systems reported in this study were developed as a part of a controlled re-

search program. The dairy herd of the Piedmont Substation was divided into two groups. One group of cows was kept on conventional pasture while the other group was on a drylot feeding program. Records were kept of all physical inputs, along with detailed costs for each system.

The feeding experiment with the Grade A herd was conducted from November 1, 1958 through October 31, 1963 – a period of 5 years. Some items in the rations fed were, of necessity, produced the year before they were fed. Consequently, some feed data were collected during the period 1958 to 1963. Information from the experiment consisted of data on amounts and costs of feed fed to each group of cows, milk production of each group, and other related data.[1] An analysis of input-output data from the controlled programs, along with complete financial data, were used in identifying, analyzing, and evaluating the problems involved in each feeding method.

Findings from the controlled research were used to develop possible alternative systems or combinations of feeding systems. Budgets were developed with emphasis on three feeding systems for a 60-cow dairy: (1) complete drylot, (2) conventional pasture, and (3) a combination of these two systems.

RATES AND PRACTICES USED IN BUDGETING GRADE A MILK PRODUCTION SYSTEMS

Rates Used in Estimating Crop Costs

The rates and practices used to develop dairy operation budgets are based on studies of crop production methods used at the Piedmont Substation primarily from 1958 to 1963. Rates or practices not available from the Piedmont Substation study were based on recommendations of staff members of the Cooperative Extension Service and Agricultural Experiment Station. No charge was made for land used in the crop budgets, but there was an interest charge on the operating capital used in crop production. Production rates used in the budgets reflect the experience and knowl-

[1] Detailed year-to-year data are not included in this report. Data on the economic phase of work are reported in "Economics of Feeding Systems for Grade A Dairies in the Piedmont Area of Alabama," a Master of Science thesis by Larry W. Roberts, available through the Auburn University Library. Also, parts of the physical data have been reported in "Forage Systems Compared for High Producing Cows," Auburn University Agricultural Experiment Station Bulletin 363, December 1965.

edge gained during the study, and are not to be considered as attainable every year. However, with good management they should represent an average for a future 5-year period. The crop budgets developed are the bases for feed costs used in the complete dairy farm budgets.

Alfalfa hay costs were based on the practice of making two applications of insecticide in the spring. The life of the alfalfa stand was estimated at 4 years with a total establishment cost of $88 per acre. Fertilizer was applied annually at the rate of 1,000 pounds of 0-10-20. Hay was cut four times with an estimated total yield of 2.1 tons per acre.

Millet was used for temporary summer grazing. The projected annual costs are subject to variation since three or four plantings were used and weather conditions caused land preparation costs to vary. A combination of ryegrass and crimson clover was used along with oats for winter grazing. There was no difference in the cost of oats and the ryegrass-crimson clover mixture, but both were used to give longer grazing periods in extreme winter weather conditions. Annual costs of producing and harvesting corn silage, as shown in the budgets, included all expenses except storage and were based on an estimated harvested yield of 9 tons per acre. Costs of forage crop production and practices used are given in Appendix Tables 1-6.

The annual costs of producing permanent pasture, consisting of white clover, improved dallisgrass, and crimson clover, totaled $25 per acre – $10 for establishment (prorated) and $15 for maintenance.

Rates Used in Estimating Labor Costs

Hours of labor used in budgeting were based on projected labor needs for both crop and livestock production. The labor involved in forage production is concentrated in a few months and may require some dairymen to hire extra labor for planting or harvesting. The amount of labor used per acre in alfalfa hay harvesting decreased with each annual cutting. Maintaining permanent pasture required fewer hours of labor than any of the annual crops. Annual crops were used in the budgets since they had proved to be more efficient in milk production than permanent pasture at the Piedmont Substation. Corn silage required a total of 18.2 manhours of labor per acre, most of it in the harvesting phase. An-

nual labor requirements for the forages used are given in Appendix Tables 7-11.

PROJECTED BUDGETS FOR GRADE A MILK PRODUCTION

Budgets were prepared for a complete Grade A dairy operation so that all costs incurred with each feeding system would be reflected in the net returns. The three feeding systems used were drylot feeding, a conventional grazing system, and a combination system using aspects of the other two methods.

In the drylot system, cows were confined to a holding area on a year-round basis. They were removed from this area only for calving. All cows were fed a grain ration, with corn silage as the only roughage.

Cows on the conventional grazing system were fed grain, as near year-round grazing as possible, and were fed hay when needed. Alfalfa hay was raised as a part of the feed program. Oats and ryegrass and crimson clover were grown for as much grazing as possible from November to May. Millet was used for grazing from May through October.

Cows on the combination system were held in drylot for 8 months of the year and were on conventional grazing for 4 months. In drylot they were fed grain, and corn silage was the only source of roughage. During June through September the cows grazed millet.

All budgets were based on 60 cows, weighing 1,250 pounds and producing 10,000 pounds of 4 per cent fat-content milk per year. The calf crop was based on a 90 per cent drop, or 54 calves per year. A death loss of 2 animals was assumed while 18 heifer calves were selected each year for replacements. The remaining 34 calves were sold at an early age.

At the end of the first 3 months, two additional heifers were culled and sold. It was also assumed that one heifer died at approximately 1 year of age. No bulls were kept under either system since all breeding was by artificial insemination.

An analysis of the feeding systems under study at the Piedmont Substation raised questions of possible alternatives. The two roughage feeds for drylot cows – corn silage and alfalfa hay – presented production problems and necessitated an investment in

both silage and hay-making equipment. Providing grazing for cows of high-producing abilities presented the problem of distance to be traveled by cows; in many respects the grazing was expensive to produce, as well as being subject to high weather risks.

The three feeding systems used in the budgets followed practices being used at the Piedmont Substation or they corresponded closely to operations at other substations. For instance, corn silage was fed as the only source of roughage to cows in the dairy herds at both the Gulf Coast and Sand Mountain substations during the past 3 years. Simplification of the feeding systems enables better management to be applied to both feed production and herd management, and lowers requirements for kinds and types of machinery and equipment needed.

Budgets for each feeding system are presented in a series of tables under the following headings: investment, annual fixed costs, feed requirements, labor requirements, land requirements, and receipts and expenses. The next several sections of this report are devoted to a comparison of the three systems regarding each of the headings listed. Detailed data are presented for the drylot system in Appendix Tables 12-17, the pasture system in Appendix Tables 18-23, and the combination system in Appendix Tables 24-29.

Dairy Investment

Total dairy capital investments, excluding land and general farm machinery, for a 60-cow herd for each of the three feeding systems are itemized in Table 1. The original or new costs for the 60-cow drylot system was $55,899. This was for a system of feeding concentrates and corn silage only. Provision was made for feeding of extra grain outside the milking parlor. Also, provision was made (fencing) for the use of some permanent pasture for replacement heifers. The investment included two silos of 555-ton capacity each, along with unloader, feeding bunk, and a feeding shed. Average total dairy investment for the drylot system was calculated at $39,583, based on one-half the new value of all items except the herd. It was assumed the herd and replacements would not change in value because of the method of keeping a constant number of animals of the same ability.

The comparable new cost investment for the pasture system was $46,754, which is $9,145 less investment capital than for the

TABLE 1. ESTIMATED DAIRY INVESTMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Item	Drylot		Pasture		Combination	
	Unit	Value	Unit	Value	Unit	Value
	No.	*Dol.*	*No.*	*Dol.*	*No.*	*Dol.*
Cows	60	18,000	60	18,000	60	18,000
Replacement heifers and calves	31	5,270	31	5,270	31	5,270
Feed storage bin	1	880	1	880	1	880
Milking parlor and milk room	1	5,460	1	5,460	1	5,460
Pipeline milkers	5	3,937	5	3,937	5	3,937
Bulk tank (800 gallons)	1	3,920	1	3,920	1	3,920
Water facilities (not including well and pump)	--	180	--	180	--	180
Concrete pavement and holding pen, square feet	7,000	3,300	7,000	3,300	7,000	3,300
Wagon (silage and manure)	1	1,200	--	--	1	1,200
Silos	2				2	
	(1,100)[1]	8,400	--	--	(770)[1]	6,400
Silage unloader	1	1,500	--	--	1	1,500
Feeding bunk	1	600	--	--	1	600
Feeding shed (silage-grain)	1	3,000	--	--	1	3,000
Fencing, rods	180	252	1,648	2,307	640	876
Barn (hay storage and feeding)	--	--	1	3,500	--	--
TOTAL	--	55,899	--	46,754	--	54,523

[1] Tons of storage capacity.

drylot system. The combination system required about the same capital investment as the drylot system.

The investment for all three systems included feed storage, milking parlor and milk room, 800-gallon milk tank, and pipeline milkers. Silage equipment was not needed for the pasture system, but it did require a combination hay storage and feeding barn that was unnecessary for the other two systems.

The dairy investment did not include investment costs for regular farm equipment, such as a tractor or planting equipment. This type equipment was provided for in the crop and pasture budgets, Appendix Tables 2-11. Therefore, it is not listed as a part of the specialized dairy investment.

Annual Fixed Costs

Included in annual fixed costs for the dairy operation were charges for interest, repairs, depreciation, taxes, and insurance.

TABLE 2. ESTIMATED ANNUAL FIXED COSTS[1] FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Item	Drylot	Pasture	Combination
	Dollars	*Dollars*	*Dollars*
Cows	1,152.00	1,152.00	1,152.00
Replacement heifers and calves	337.20	337.20	337.20
Feed storage bin	101.20	101.20	101.20
Milking parlor and milk room	471.80	471.80	471.80
Pipeline milkers	478.14	478.14	478.14
Bulk tank	473.60	473.60	473.60
Water facilities	19.50	19.50	19.50
Concrete holding pen	236.00	236.00	236.00
Wagon	166.50	----	166.50
Silos	802.00	----	602.00
Silage unloader	352.00	----	352.00
Feeding bunk	97.00	----	97.00
Feeding shed	290.00	----	290.00
Fencing	26.65	209.18	102.78
Barn	----	340.00	----
TOTAL	5,003.59	3,818.62	4,879.72

[1] Fixed costs include interest on average investment, depreciation, repairs, taxes, and insurance.

All costs were figured on the average dairy investment since this represented the capital investment in dairy items over their lifetime. Total annual fixed costs were $5,003.59 for the drylot operation, Table 2, about the same as the combination system. Pasture system annual fixed costs were $1,200 (24 per cent) less than for the drylot system.

Annual fixed costs charged in the budgets are necessary for one to remain in the dairy business for a long period. Parts of these costs occur each year as direct cash costs, such as repairs, taxes, and insurance, while others like interest on investment and depreciation are non-cash cost items. A dairyman may fail to charge these non-cash costs in the short run and remain in the dairy business. Over a long period, however, these costs must be covered if the dairy operation is to be successful. Should the dairy farmer have no profitable alternatives, he could keep producing milk as long as his cash costs and labor costs are covered. This would be possible, at least, until buildings and equipment became unserviceable.

Annual Feed Requirements

Cows were fed at the rate of 7,200 pounds of total digestible nutrients per year. Forages used in the budgets were produced on the farm. Because of the high cost of producing corn in the Pied-

mont Area, it is often advisable to purchase grain rather than to grow it. Budgets used in this report are based on buying all concentrate feeds. The mixed feed purchased contained 16 per cent protein, with 7 per cent maximum fiber, in small pellet form. It was bought F.O.B. the farm at $62 per ton in 12-ton lots. Concentrates were fed at the rate of 1.36 tons per cow, 0.50 ton per yearling, and 0.14 ton per calf per year, Table 3, the same for all forage feeding systems.

Corn silage feeding amounted to 1,100 tons for the drylot group and 762 tons for the combination group based on harvest weights. This difference between the two systems reflects the difference in time silage was fed – 12 months for the drylot group and 8 months for the combination group. Silage weights were based on a harvested weight to figure land requirements in planting silage.

Permanent pasture, consisting of white clover, crimson clover, and improved dallisgrass, was furnished for replacement stock at the rate of two-thirds acre per head for the drylot group. Cows in the pasture feeding system were on a conventional type of hay and grazing program. In the hay barn developed for this study, hay was stored from the ground level up and pushed into racks for feeding. Cows were fed from two sides of the barn.

The combination system used millet for summer grazing with drylot feeding the remainder of the year. Calves raised in all systems were fed 360 pounds of milk each, for a total of 5,800 pounds. This amount was taken from the herd milk production. All phases of the feed program used with the systems budgeted were used 3

TABLE 3. ESTIMATED ANNUAL FEED REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Item	Drylot	Pasture	Combination
Silage, harvested weight	1,100 tons[1]		762 tons[2]
Concentrate (pellets)[3]	91.4 tons	91.4 tons	91.4 tons
Improved pasture	20 acres[4]	----	----
Alfalfa hay	----	78 tons[5]	----
Millet	----	80 acres	80 acres
Ryegrass-crimson clover	----	75 acres	----
Oats	----	25 acres	----
Milk for replacement calves[6]	5,800 lb.	5,800 lb.	5,800 lb.

[1] 17.5 tons per cow, 3.0 tons per yearling, and 0.25 ton per calf.
[2] 11.75 tons per cow, 3.50 tons per yearling, and 0.25 ton per calf.
[3] 1.36 tons per cow, 0.50 ton per yearling, and 0.14 ton per calf.
[4] 0.66 acre per replacement.
[5] 1.0 ton per cow, 1.0 ton per yearling, and 0.2 ton per calf.
[6] 360 pounds per replacement calf.

or more years with some dairy herd in the Agricultural Experiment Station System.

Labor Requirements

Labor requirements for each forage system were divided into two major groups – herd care (management) and feed production. Labor needed for either purpose could be family or hired labor, but it was charged in the budgets at $1 per hour. In all budgets, 3,100 hours of labor was shown as needed for herd management, Table 4. This included time for feeding, breeding, milking, barn sanitation, care of replacement stock, and all other chore work. The management system was not identical in the three systems. Some jobs in the drylot system, such as cleaning the holding lot, did not occur in the pasture system. Likewise, the pasture herd had to be moved to and from grazing areas. All data available indicated that total time required for herd management was about the same despite some differences in jobs.

TABLE 4. ESTIMATED LABOR REQUIREMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Labor use	Drylot	Pasture	Combination
	Hours	*Hours*	*Hours*
Herd management	3,100	3,100	3,100
Silage	2,220	----	1,547
Pasture	60	----	----
Millet	----	376	376
Alfalfa hay	----	592	----
Oats	----	112	----
Ryegrass and clover	----	345	----
TOTAL	5,380	4,525	5,023

Labor requirements for feed production varied by enterprises, as shown by detailed records kept each year. Labor requirements are shown by months of the year for each system in the Appendix Tables. Labor requirement for feed production was 855 hours less for the pasture system than for the drylot herd. Silage production and harvesting increased labor requirements for the drylot system.

Land Requirement

Cows in the drylot system were kept in a 10-acre lot and barn area. This was more land than would be needed on many farms. However, this amount was budgeted as a guide for the Piedmont

TABLE 5. ESTIMATED LAND REQUIREMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Use	Drylot	Pasture	Combination
	Acres	*Acres*	*Acres*
Holding area	10	3	10
Corn silage	122	----	85
Permanent pasture	20	----	----
Millet	----	80	80
Oats	----	25	----
Alfalfa hay	----	37	----
Ryegrass and clover	----	75	----
TOTAL	152	220	175

Area. Other land needed for this system included 122 acres for corn silage and 20 acres of permanent pasture for replacement heifers, a total of 152 acres, Table 5.

There was no double-cropping of land used in the budgets. Double-cropping was attempted in some years in the control work in terms of winter grazing followed by millet, and with an early and late millet planting on the same area. In all cases, double-cropping led to a number of problems. Consequently, the conclusion was reached that no attempt should be made to double-crop as a means of reducing land requirements for any of the feeding systems. Good management is required to have grazing of the quality needed over a long part of the year for the pasture system. It is better that proper management be used to get the quantity and quality of grazing needed than to use management and labor in an effort to reduce land requirements.

Land requirements were highest in the pasture system since a large proportion of the forages was harvested by the cows. The combination system provided some saving in land. Each system had 60 cows and 31 replacements for a total of 72 mature animal units. Acreage used for feed crops, per animal unit, amounted to 1.97 for drylot system, 2.29 for combination, and 3.01 for the pasture system.

Farm operators might find land requirements to be greater or less than that budgeted for either system because of differences in land quality, fertilization rates, or other management practices. As land values become higher, it becomes important that farm operators use high production crops that will enable a given number of cows to be fed from a smaller acreage of land. In this study, a land value of $100 per acre was used for open land usable for crops or pasture.

Receipts and Expenses

In all systems, the budgeted total receipts amounted to $35,910, Table 6. Total milk sold was 594,200 pounds, at a blend price of $5.50 per hundred pounds. Other sales included cull cows and heifers and surplus calves. All phases of this study were restricted to the dairy enterprise as a source of income or expenses.

Expenses charged to each budget should cover all items occurring on any dairy operation, both cash and non-cash, except for a charge for land and management. In this study, "net returns" (the difference between receipts and expenses) is a return to land and management – the two unpaid items.

All feed crops and pasture costs were entered as an expense by multiplying cost per acre by the number of acres. For example, corn silage cost for the drylot operation was based on $65 per acre

TABLE 6. ESTIMATED RECEIPTS AND EXPENSES FOR A 60-COW HERD, GRADE A MILK PRODUCTION, THREE FEEDING SYSTEMS, PIEDMONT AREA, ALABAMA

Item	Drylot	Pasture	Combination
	Dollars	*Dollars*	*Dollars*
Receipts			
Milk, 5,942 cwt. @ $5.50	32,681.00	32,681.00	32,681.00
Cull cows, 14 @ $188.50	2,639.00	2,639.00	2,639.00
Calves, 34 @ $15	510.00	510.00	510.00
Cull heifers, 2 @ $40	80.00	80.00	80.00
TOTAL RECEIPTS	35,910.00	35,910.00	35,910.00
Expenses			
Permanent pasture, 20 acres @ $25	500.00	----	----
Corn silage @ $65 acre	7,930.00		5,525.00
Concentrates (pellets) @ $62 ton	5,666.80	5,666.80	5,666.80
Marketing cull cows	79.17	79.17	79.17
Hauling cull cows	30.00	30.00	30.00
Milk hauling @ 35¢ cwt.	2,079.70	2,079.70	2,079.70
Veterinary expenses	360.00	360.00	360.00
Electricity	300.00	300.00	300.00
Artificial breeding	480.00	480.00	480.00
Dairy supplies	360.00	360.00	360.00
Miscellaneous	240.00	240.00	240.00
Cleaning holding lot	208.00	----	118.00
Dairy labor @ $1 per hour	3,100.00	3,100.00	3,100.00
Interest on operating capital	294.11	287.87	291.41
Fixed costs (Table 2)	5,003.59	3,818.62	4,879.72
Ryegrass and clover, 75 acres @ $35.62	----	2,671.50	----
Oats, 25 acres @ $35.80	----	895.00	
Millet, 80 acres @ $33	----	2,640.00	2,640.00
Alfalfa, 37 acres @ $84	----	3,108.00	----
TOTAL COST	26,631.37	26,116.66	26,149.80
Net returns (to land and management)	9,278.63	9,793.34	9,760.20

times 122 acres. Charges for producing and harvesting an acre of silage are detailed in Appendix Table 6. The charges for silage production include machinery and equipment, power, and all other charges. Costs for storage of silage were included as a "fixed cost" and are transferred from Table 2.

Production costs for the dairy operation fall into three major groups – feed, labor, and all other expenses. The percentage of total costs used for each of these purposes, by systems, was as follows:

Cost group	*Percentage of total, by system*		
	Drylot	*Pasture*	*Combination*
Feed	52.9	57.4	52.9
Labor	11.6	11.9	11.9
All other	35.5	30.7	35.2
TOTAL	100.0	100.0	100.0

Total costs for each system varied by only about $500. There were much larger differences than this between feed costs and other costs from one system to the other. Feed costs, as shown in Table 6, amounted to $14,096.80 for the drylot system, $14,981.30 for the pasture, and $13,831.80 for the combination system. These costs were for the production and harvesting of crops, pastures, and hay. Storage costs were charged as fixed costs, and these were highest for the drylot and combination systems and least for the pasture system. It was these expenses that made total costs about the same for each system. Dairy operators have an opportunity to lower their milk production costs in all major cost groups. However, the opportunity to do this is perhaps greatest with feed, followed by labor second and other costs third.

Total production costs per hundredweight of milk produced, excluding land and management costs, were $4.44 for the drylot system, $4.35 for the pasture system, and $4.36 for the combination method. These costs included all items normally included in costs accounting except for a land charge and a management cost. By adding a land charge of $5 per acre, production costs per hundredweight of milk produced become $4.54 for the drylot, $4.50 for the pasture, and $4.48 for the combination method.

Returns to Each System

Net returns to land and management for the three feeding systems were $9,793 for the pasture, $9,279 for drylot, and $9,760

for the combination method. The pasture system was only $33 above the combination system but $514 over the drylot system in net returns. Although returns were about the same, there are some major differences in the uses of land, labor, and capital investments in the three systems.

If a charge were made for land, the remaining return becomes a reward to management. The land used in this study was valued at $100 per acre. If a charge of 5 per cent interest were made ($5 per acre), this amount times the acreage used can be subtracted from net return to calculate the return to management. The combination system provided the highest returns to management, the pasture system next, and the drylot method lowest, Table 7. Net returns to management only were: combination system, $8,885; pasture, $8,693; and drylot, $8,519.

The value of labor used for both herd management and feed production, charged at $1 per hour, was $5,380 for the drylot system, $5,023 for the combination system, and $4,525 for the pasture system. This would be of importance to the dairyman with a labor problem or to the dairyman with available family labor. A dairyman with limited land could substitute some labor for land by using the drylot or combination system. If a family could furnish all labor needed, a dairyman would be interested in returns to both labor and management. Net returns to labor and management were $13,899 for the drylot system, $13,908 for the combination system, and $13,218 for the pasture method.

TABLE 7. COMPARISONS OF DRYLOT, PASTURE, AND COMBINATION TYPE BUDGETS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PIEDMONT AREA, ALABAMA

Item	Drylot (152 acres)	Pasture (220 acres)	Combination (175 acres)
	Dollars	*Dollars*	*Dollars*
Net returns to land and management	9,279	9,793	9,760
Charge for land @ $5 per acre	760	1,100	875
Returns to management only	8,519	8,693	8,885
Value of labor @ $1 per hour	5,380	4,525	5,023
Returns to labor and management	13,899	13,218	13,908

APPENDIX

APPENDIX TABLE 1. RATES CHARGED PER HOUR FOR THE USE OF PRODUCTION ITEMS, PIEDMONT SUBSTATION, CAMP HILL, ALABAMA, 1959-1963

Item	Rate per hour	Item	Rate per hour	Item	Rate per hour
	Dollars		*Dollars*		*Dollars*
Tractor (large)	1.25	Fertilizer spreader	0.30	Mower	0.66
Tractor (medium)	1.15	Light disk	0.40	Rake	0.71
Tractor (small)	1.05	Cultivator	0.26	Hay baler	2.40
Plow (3-disk)	0.39	Grain distributor	0.55	Combine	5.00
Plow (2-disk)	0.28	Silage harvester	1.90	Truck	1.15
Tool bar	0.60	Silage blower	1.17	Trailer	0.10
Disk harrow	0.75	Cultipacker	0.30	Man labor	1.00
2-row planter	0.45	Hay conditioner	0.45	Pre-emergence equipment	0.24
				Spray rig	0.37

APPENDIX TABLE 2. PROJECTED ANNUAL COSTS PER ACRE FOR GROWING ALFALFA HAY, PIEDMONT AREA, ALABAMA

Cost item	Rate	Amount[1]
	Dollars	*Dollars*
Establishment costs, one-fourth of total	22.00/acre	22.00
Fertilizer, 1,000 pounds of 0-10-20	1.90/cwt.	19.00
Spreading fertilizer and insecticide	7.75/acre	7.75
Insecticide, two applications	2.15/application	4.30
Cut, condition, and bale four cuttings	5.36/cutting	21.45
Haul hay from four cuttings	1.69/cutting	6.75
Taxes	0.35/acre	0.35
Interest on operating capital		2.40
TOTAL		84.00
Production per acre, tons		*2.1*
Cost of hay per ton, dollars		*40.00*

[1] Storage costs are included in fixed costs of the budget.

APPENDIX TABLE 3. PROJECTED ANNUAL COSTS PER ACRE FOR PRODUCING MILLET, PIEDMONT AREA, ALABAMA

Cost item	Rate	Amount
	Dollars	*Dollars*
Millet seed, 30 pounds	0.20/pound	6.00
Fertilizer, 267 pounds of 13-13-13	3.00/cwt.	8.01
Ammonium nitrate, 110 pounds	3.90/cwt.	4.29
Labor, 4.7 hours	1.00/hour	4.70
Power and equipment	7.20/acre	7.20
Taxes	0.35/acre	0.35
Fence	1.50/acre	1.50
Interest on operating capital		0.95
TOTAL		33.00

APPENDIX TABLE 4. PROJECTED ANNUAL COSTS PER ACRE FOR PRODUCING RYEGRASS AND CRIMSON CLOVER, PIEDMONT AREA, ALABAMA

Cost item	Rate	Amount
	Dollars	*Dollars*
Ryegrass seed, 42 pounds	0.08/pound	3.36
Crimson clover seed, 28 pounds	0.21/pound	5.88
Fertilizer, 215 pounds of 13-13-13	3.00/cwt.	6.45
Ammonium nitrate, 125 pounds	3.90/cwt.	4.88
Power and equipment	7.56/acre	7.56
Labor, 4.6 hours	1.00/hour	4.60
Taxes	0.35/acre	0.35
Fence	1.50/acre	1.50
Interest on operating capital		1.04
TOTAL		35.62

APPENDIX TABLE 5. PROJECTED ANNUAL COSTS PER ACRE FOR PRODUCING OATS, PIEDMONT AREA, ALABAMA

Cost item	Rate	Amount
	Dollars	*Dollars*
Oats seed, 3 bushels	1.50/bushel	4.50
Fertilizer, 260 pounds of 13-13-13	3.00/cwt.	7.80
Ammonium nitrate, 200 pounds	3.90/cwt.	7.80
Labor, 4.5 hours	1.00/hour	4.50
Power and equipment	8.30/acre	8.30
Fence	1.50/acre	1.50
Taxes	0.35/acre	0.35
Interest on operating capital		1.05
TOTAL		35.80

APPENDIX TABLE 6. PROJECTED ANNUAL COSTS PER ACRE FOR PRODUCING AND HARVESTING CORN SILAGE, PIEDMONT AREA, ALABAMA

Cost item	Rate	Amount[1]
	Dollars	*Dollars*
Corn seed, 8 pounds	0.22/pound	1.76
Pre-emerge chemical, 1.5 pounds	2.50/pound	3.75
Fertilizer, 265 pounds of 13-13-13	3.00/cwt.	7.95
Ammonium nitrate, 131 pounds	3.90/cwt.	5.11
Tractor, 12.4 hours	1.20/hour	14.88
Equipment, harvester and blower	8.46/acre	8.46
Truck and trailers	3.35/acre	3.35
Labor, 18.2 hours	1.00/hour	18.20
Taxes	0.35/acre	0.35
Interest on operating capital		1.19
TOTAL		65.00[1]
Production per acre, tons harvested weight		*9.0*
Costs per ton		*7.22*[1]

[1] Storage costs are in the fixed costs of the budgets.

APPENDIX TABLE 7. ESTIMATED LABOR REQUIRED PER ACRE TO PRODUCE AND HARVEST ALFALFA HAY, PIEDMONT AREA, ALABAMA

Operation	Date	Hours per acre[1]
Spread fertilizer	March	1.5
Apply insecticide	March	1.2
First cutting	April	4.0
Second cutting	May	3.5
Third cutting	June	3.0
Fourth cutting	July or August	2.8
TOTAL		16.0

[1] Based on a harvested yield of 2.1 tons per acre.

APPENDIX TABLE 8. ESTIMATED LABOR REQUIRED PER ACRE TO PRODUCE OATS, RYEGRASS AND CRIMSON CLOVER, PIEDMONT AREA, ALABAMA

Operation	Date	Hours per acre	
		Oats	Ryegrass and crimson clover
Break	June	1.0	1.0
Fallow	July	1.0	1.0
Plant	August	2.0	2.0
Topdress	September	0.5	0.6
TOTAL		4.5	4.6

APPENDIX TABLE 9. ESTIMATED LABOR REQUIRED PER ACRE TO MAINTAIN PERMANENT PASTURE, PIEDMONT AREA, ALABAMA

Operation	Date	Hours per acre
Fertilizer spreading	April	1.2
Mowing	June	.7
Mowing	July	1.1
TOTAL		3.0

APPENDIX TABLE 10. ESTIMATED LABOR REQUIRED PER ACRE TO PRODUCE MILLET, PIEDMONT AREA, ALABAMA

Operation	Date	Hours per acre
Prepare and plant	April	4.0
Topdress	May	0.7
TOTAL		4.7

APPENDIX TABLE 11. ESTIMATED LABOR REQUIRED PER ACRE TO PRODUCE AND HARVEST CORN SILAGE, PIEDMONT AREA, ALABAMA

Operation	Date	Hours per acre
Plowing	January	0.6
Plowing	February	0.3
Disk and harrow	April	1.3
Harrow	May	0.9
Pre-emerge, fertilizer and plant	May	2.2
Cultivate	May	0.7
Cultivate and sidedress	June	0.7
Harvest	August	11.5
TOTAL		18.2

APPENDIX TABLE 12. ESTIMATED DAIRY INVESTMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Value	
		New	Average
		Dollars	*Dollars*
Cows	60	18,000	18,000
Replacement heifers and calves	31	5,270	5,270
Feed storage	1	880	440
Milking parlor and milk room	1	5,460	2,730
Pipeline milkers	5	3,937	1,968
Bulk tank (800 gallons)	1	3,920	1,960
Water facilities (not including well and pump)		180	90
Concrete pavement (7,000 square feet with holding pen)	1	3,300	1,650
Wagon (silage and manure)	1	1,200	600
Silos (24 × 50 ft., 555 tons each)	2	8,400	4,200
Unloader and feeder	1	1,500	750
Bunk	1	600	300
Feeding shed (silage and outside grain feeding)	1	3,000	1,500
Fencing (180 rods)		252	125
TOTAL		55,899	39,583

APPENDIX TABLE 13. ESTIMATED ANNUAL FIXED COSTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Annual fixed costs			
		Interest	Depreciation and repairs	Taxes and insurance	Total
		Dollars	*Dollars*	*Dollars*	*Dollars*
Cows	60	1,080.00		72.00	1,152.00
Replacement stock	31	316.20		21.00	337.20
Feed storage	1	26.40	52.80	22.00	101.20
Milking parlor and milk room	1	163.80	273.00	35.00	471.80
Pipeline milkers	5	118.08	334.56	25.50	478.14
Bulk milk tank	1	117.60	330.00	26.00	473.60
Water facilities		5.40	13.80	0.30	19.50
Concrete pavement	1	99.00	132.00	5.00	236.00
Feeding shed	1	90.00	180.00	20.00	290.00
Wagon	1	36.00	120.00	10.50	166.50
Feeding bunk	1	36.00	60.00	1.00	97.00
Silos	2	252.00	420.00	130.00	802.00
Unloader and feeder	1	45.00	300.00	7.00	352.00
Fencing		7.50	18.75	0.40	26.65
TOTAL		2,392.98	2,234.91	375.70	5,003.59

APPENDIX TABLE 14. ESTIMATED ANNUAL FEED REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Feed item	Unit	Quantity
Silage[1] (corn) 17.5 tons per cow 3.0 tons per yearling .25 ton per calf	ton	1,100.0
Concentrates (pellets) 1.36 tons per cow .50 ton per yearling .14 ton per calf	ton	91.4
Pasture (white clover, crimson clover, and improved dallisgrass) .66 acre per replacement	acre	20.0
Milk 360 pounds per replacement	cwt.	58.0

[1] Quantities fed are reported as harvested weights.

APPENDIX TABLE 15. ESTIMATED LABOR REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Month	Herd management	Corn silage (122 acres)	Permanent pasture (20 acres)	Total
	Hours	*Hours*	*Hours*	*Hours*
January	290	73.2		363.2
February	260	36.6		296.6
March	270	73.2		343.2
April	235	195.2	24	454.2
May	240	353.8		593.8
June	241	85.4	14	340.4
July	244		22	266.0
August	249	1,403.0		1,652.0
September	248			248.0
October	258			258.0
November	273			273.0
December	292			292.0
TOTAL	3,100	2,220.4	60	5,380.4

APPENDIX TABLE 16. ESTIMATED LAND REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Use	Herd space[1]	Corn silage[2]	Permanent pasture	Total
	Acres	*Acres*	*Acres*	*Acres*
Row crop land		122		122
Grazing land			20	20
Holding area	10			10
TOTAL	10	122	20	152

[1] Includes 60 cows, 15 yearling heifers, and 16 calves.
[2] Based on a harvested yield of 9 tons per acre.

APPENDIX TABLE 17. ESTIMATED ANNUAL RECEIPTS AND EXPENSES FOR A 60-COW HERD, GRADE A MILK PRODUCTION, DRYLOT FEEDING, PIEDMONT AREA, ALABAMA

Item	Rate	Amount
	Dollars	*Dollars*
Receipts		
Milk, 10,000 pounds per cow less 96 pounds for calves, total 5,942 hundredweight	5.50/cwt.	32,681.00
Cull cows, 14 head[1] weighing 1,300 pounds each	188.50/head	2,639.00
Calves, day-old, 34 head	15.00/head	510.00
Cull heifers, 3 months old, 2 head	40.00/head	80.00
TOTAL RECEIPTS		35,910.00
Expenses		
Pasture, 20 acres[2]	25.00/acre	500.00
Corn silage, 122 acres	65.00/acre	7,930.00
Concentrates, 91.4 tons	62.00/ton	5,666.80
Marketing 14 cull cows, share of $2,639 total	.03/dollar	79.17
Hauling cull cows, 200 miles	.15/mile	30.00
Milk hauling, 5,942 hundredweight	.35/cwt.	2,079.70
Veterinary expense, 12 months	30.00/month	360.00
Electricity, 12 months	25.00/month	300.00
Artificial breeding, 60 cows	8.00/head	480.00
Dairy supplies, 60 cows	6.00/head	360.00
Miscellaneous, 60 cows[3]	4.00/head	240.00
Cleaning holding lot, 10 times	20.80/time	208.00
Labor, 3,100 hours	1.00/hour	3,100.00
Interest on operating capital, $4,901.85[4]	.06	294.11
Fixed costs (Appendix Table 13)		5,003.59
TOTAL EXPENSES		26,631.37
Net returns (to land and management)		9,278.63

[1] A death loss of 1 is assumed out of the 15 cull cows.
[2] Costs for grazing crops do not include a land charge.
[3] Dues, fees, and other.
[4] Half of $9,803.70.

APPENDIX TABLE 18. ESTIMATED INVESTMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Value	
		New	Average
		Dollars	*Dollars*
Cows	60	18,000	18,000
Replacement heifers and calves	31	5,270	5,270
Feed storage	1	880	440
Milking parlor and milk room	1	5,460	2,730
Pipeline milkers	5	3,937	1,968
Bulk tank (800 gallons)	1	3,920	1,960
Water facilities (not including well and pump)		180	90
Concrete pavement (7,000 square feet with holding pen)	1	3,300	1,650
Barn (hay storage and feeding)	1	3,500	1,750
Fencing (1,648 rods of 4-strand barbed wire)		2,307	1,153
TOTAL		46,754	35,011

APPENDIX TABLE 19. ESTIMATED ANNUAL FIXED COSTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Annual fixed costs			
		Interest	Depreciation and repairs	Taxes and insurance	Total
		Dollars	*Dollars*	*Dollars*	*Dollars*
Cows	60	1,080.00		72.00	1,152.00
Replacement heifers and calves	31	316.20		21.00	337.20
Feed storage	1	26.40	52.80	22.00	101.20
Milking parlor and milk room	1	163.80	273.00	35.00	471.80
Pipeline milkers	5	118.08	334.56	25.50	478.14
Bulk tank	1	117.60	330.00	26.00	473.60
Water facilities		5.40	13.80	0.30	19.50
Concrete pavement	1	99.00	132.00	5.00	236.00
Barn	1	105.00	210.00	25.00	340.00
Fencing	1	69.18	138.00	2.00	209.18
TOTAL		2,100.66	1,484.16	233.80	3,818.62

APPENDIX TABLE 20. ESTIMATED ANNUAL FEED REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Unit	Quantity
Concentrates (pellets)	ton	91.4
1.36 tons per cow		
.50 ton per yearling		
.14 ton per calf		
Hay (alfalfa)	ton	78.0
1.0 ton per cow		
1.0 ton per yearling		
.2 ton per calf		
Grazing, summer (millet)	acre	80.0
Grazing, fall and winter (ryegrass and crimson clover)	acre	75.0
Grazing, fall and winter (oats)	acre	25.0
Milk	cwt.	58.0
360 pounds per replacement		

APPENDIX TABLE 21. ESTIMATED LABOR REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Month	Herd management	Millet (80 acres)	Alfalfa hay (37 acres)	Oats (25 acres)	Ryegrass and crimson clover (75 acres)	Total
	Hours	*Hours*	*Hours*	*Hours*	*Hours*	*Hours*
January	290					290.0
February	260					260.0
March	270		99.9			369.9
April	235	80	148.0			463.0
May	240	94	129.5			463.5
June	241	94	111.0	25.0	75	546.0
July	244	94		25.0	75	438.0
August	249	14	103.6	50.0	150	566.6
September	248			12.5	45	305.5
October	258					258.0
November	273					273.0
December	292					292.0
TOTAL	3,100	376	592.0	112.5	345	4,525.5

APPENDIX TABLE 22. ESTIMATED LAND REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Use	Herd space[1]	Millet	Oats	Alfalfa hay[2]	Ryegrass and crimson clover	Total
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Grazing land		80	25		75	180
Cropland				37		37
Holding area	3					3
TOTAL	3	80	25	37	75	220

[1] Includes 60 cows, 15 yearling heifers, and 16 calves.
[2] Based on a yield of 2.1 tons per acre.

APPENDIX TABLE 23. ESTIMATED ANNUAL RECEIPTS AND EXPENSES FOR A 60-COW HERD, GRADE A MILK PRODUCTION, PASTURE TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Rate	Amount
	Dollars	*Dollars*
Receipts		
Milk, 10,000 pounds per cow less 96 pounds for calves, total 5,942 hundredweight	5.50/cwt.	32,681.00
Cull cows, 14 head[1] weighing 1,300 pounds each	188.50/head	2,639.00
Calves, day-old, 34 head	15.00/head	510.00
Cull heifers, 3 months old, 2 head	40.00/head	80.00
TOTAL RECEIPTS		35,910.00
Expenses		
Ryegrass and crimson clover, 75 acres[2]	35.62/acre	2,671.50
Oats, 25 acres	35.80/acre	895.00
Millet, 80 acres	33.00/acre	2,640.00
Alfalfa, 37 acres	84.00/acre	3,108.00
Concentrates, 91.4 tons	62.00/ton	5,666.80
Marketing 14 cull cows, share of $2,639 total	.03/dollar	79.17
Hauling cull cows, 200 miles	.15/mile	30.00
Milk hauling, 5,942 hundredweight	.35/cwt.	2,079.70
Veterinary expense, 12 months	30.00/month	360.00
Electricity, 12 months	25.00/month	300.00
Dairy supplies, 60 cows	6.00/head	360.00
Miscellaneous, 60 cows[3]	4.00/head	240.00
Artificial breeding, 60 cows	8.00/head	480.00
Labor, 3,100 hours	1.00/hour	3,100.00
Interest on operating capital, $4,797.84[4]	.06	287.87
Fixed costs (Appendix Table 19)		3,818.62
TOTAL EXPENSES		26,116.66
Net returns (to land and management)		9,793.34

[1] A death loss of 1 is assumed out of the 15 cull cows.
[2] Cost for grazing or hay does not include a land charge.
[3] Dues, fees and other.
[4] One-half of $9,595.67.

APPENDIX TABLE 24. ESTIMATED INVESTMENT FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Value	
		New	Average
		Dollars	*Dollars*
Cows	60	18,000	18,000
Replacement heifers and calves	31	5,270	5,270
Feed storage	1	880	440
Milking parlor and milk room	1	5,460	2,730
Pipeline milkers	5	3,937	1,968
Bulk tank (800 gallons)	1	3,920	1,960
Water facilities (not including well and pump)		180	90
Concrete pavement (7,000 square feet with holding pen)	1	3,300	1,650
Silos (20 × 50 feet, 385 tons)	2	6,400	3,200
Fencing (640 rods of 4-strand barbed wire)		876	438
Wagon (silage and manure)	1	1,200	600
Unloader and feeder	1	1,500	750
Bunk	1	600	300
Feeding shed	1	3,000	1,500
TOTAL		54,523	38,896

APPENDIX TABLE 25. ESTIMATED ANNUAL FIXED COSTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Number	Annual fixed costs			
		Interest	Depreciation and repairs	Taxes and insurance	Total
		Dollars	*Dollars*	*Dollars*	*Dollars*
Cows	60	1,080.00		72.00	1,152.00
Replacement heifers and calves	31	316.20		21.00	337.20
Feed storage	1	26.40	52.80	22.00	101.20
Milking parlor and milk room	1	163.80	273.00	35.00	471.80
Pipeline milkers	5	118.08	334.56	25.50	478.14
Bulk tank	1	117.60	330.00	26.00	473.60
Water facilities		5.40	13.80	0.30	19.50
Concrete pavement	1	99.00	132.00	5.00	236.00
Silos	2	192.00	300.00	110.00	602.00
Fencing		26.28	75.00	1.50	102.78
Wagon	1	36.00	120.00	10.50	166.50
Unloader and feeder	1	45.00	300.00	7.00	352.00
Bunk	1	36.00	60.00	1.00	97.00
Feeding shed	1	90.00	180.00	20.00	290.00
TOTAL		2,351.76	2,171.16	356.80	4,879.72

APPENDIX TABLE 26. ESTIMATED ANNUAL FEED REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Feed item	Unit	Quantity
Concentrates (pellets)	ton	91.4
1.36 tons per cow		
.50 ton per yearling		
.14 ton per calf		
Silage (corn)[1]	ton	762.0
11.75 tons per cow		
3.50 tons per yearling		
.25 ton per calf		
Grazing, summer (millet)	acre	80.0
Milk	cwt.	58.0
360 pounds per replacement		

[1] Quantities fed are reported as harvested weights.

APPENDIX TABLE 27. ESTIMATED LABOR REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Month	Herd management	Millet (80 acres)	Silage (85 acres)	Total
	Hours	*Hours*	*Hours*	*Hours*
January	290		51.0	341.0
February	260		25.5	285.5
March	270		51.0	321.0
April	235	80	136.0	451.0
May	240	94	246.5	580.5
June	241	94	59.5	394.5
July	244	94		338.0
August	249	14	977.5	1,240.5
September	248			248.0
October	258			258.0
November	273			273.0
December	292			292.0
TOTAL	3,100	376	1,547.0	5,023.0

APPENDIX TABLE 28. ESTIMATED LAND REQUIREMENTS FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Use	Herd space[1]	Millet	Corn silage[2]	Total
	Acres	*Acres*	*Acres*	*Acres*
Grazing land		80		80
Row crop land			85	85
Holding area	10			10
TOTAL	10	80	85	175

[1] Includes 60 cows, 15 yearling heifers, and 16 calves.
[2] Based on a harvested yield of 9 tons per acre.

APPENDIX TABLE 29. ESTIMATED ANNUAL RECEIPTS AND EXPENSES FOR A 60-COW HERD, GRADE A MILK PRODUCTION, COMBINATION TYPE FEEDING, PIEDMONT AREA, ALABAMA

Item	Rate	Amount
	Dollars	*Dollars*
Receipts		
Milk, 10,000 pounds per cow less 96 pounds for calves, total 5,942 hundredweight	5.50/cwt.	32,681.00
Cull cows, 14 head[1] weighing 1,300 pounds each	188.50/head	2,639.00
Calves, day-old, 34 head	15.00/head	510.00
Cull heifers, 3 months old, 2 head	40.00/head	80.00
TOTAL RECEIPTS		35,910.00
Expenses		
Millet, 80 acres	33.00/acre[2]	2,640.00
Corn silage, 85 acres	65.00/acre	5,525.00
Concentrates, 91.4 tons	62.00/ton	5,666.80
Marketing 14 cull cows, share of $2,639 total	.03/dollar	79.17
Hauling cull cows, 200 miles	.15/mile	30.00
Milk hauling, 5,942 hundredweight	.35/cwt.	2,079.70
Veterinary expense, 12 months	30.00/month	360.00
Electricity, 12 months	25.00/month	300.00
Dairy supplies, 60 cows	6.00/head	360.00
Miscellaneous, 60 cows[3]	4.00/head	240.00
Artificial breeding, 60 cows	8.00/head	480.00
Cleaning holding lot, 5 times	23.60/time	118.00
Labor, 3,100 hours	1.00/hour	3,100.00
Interest on operating capital, $4,856.84[4]	.06	291.41
Fixed costs (Appendix Table 25)		4,879.72
TOTAL EXPENSES		26,149.80
Net returns (to land and management)		9,760.20

[1] A death loss of 1 is assumed out of the 15 cull cows.
[2] Costs for grazing crops do not include a land charge.
[3] Dues, fees, and other.
[4] One-half of $9,713.67.