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Beef cattle production : costs and returns for the cow-calf system in West Virginia

Alfred L. Barr

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BEEF CATTLE PRODUCTION

COSTS AND RETURNS FOR THE COW-CALF SYSTEM IN WEST VIRGINIA

WEST VIRGINIA UNIVERSITY
AGRICULTURAL EXPERIMENT STATION

THE AUTHOR

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WEST VIRGINIA UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
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Contents

	Page
INTRODUCTION	3
FORAGE REQUIREMENTS AND PRODUCTION	4
ALFALFA-ORCHARDGRASS HAY	5
ORCHARDGRASS HAY	6
CLOVER-TIMOTHY HAY	7
CORN SILAGE	8
CAPITAL REQUIREMENTS	9
MACHINERY INVESTMENT AND COSTS	9
LAND INVESTMENT	14
Cropland Requirements	14
Pasture Land Requirements	15
FENCE COSTS	16
BUILDING INVESTMENT	17
BULL DEPRECIATION	18
GROSS INCOME	18
WEIGHT	20
PRICE	20
RETURNS TO OWNED FACTORS	23
SUMMARY AND CONCLUSIONS	38

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Beef Cattle Production: Costs and Returns for the Cow-Calf System in West Virginia¹

ALFRED L. BARR

Introduction

IN WEST VIRGINIA sales of forage-consuming livestock represent about $\frac{1}{2}$ of the value of all farm products sold. Not only is livestock a major source of income to farmers of the State, but it is the major source of income in some counties.

The State's rough terrain makes much of the land unsuitable for agricultural uses other than for livestock production. The steepness of the terrain dictates that much of the land be used for permanent pasture with only the small valleys and gentle slopes available for row crop production and for meadows.

Forage is basic to livestock production. Pastures provide forage for summer grazing, while meadows and corn are used to produce hay and silage for winter feed. Also, livestock provides the only available market for much of the pasture, hay, and silage produced within the State.

In recent years, the number of cattle kept for milk has declined from 322,000 in 1950 to 167,000 in 1965. This decline leaves more forage (pasture, hay and silage) available for the other classes of grazing livestock, namely, beef and sheep. Although sheep have been one of the more profitable enterprises per animal unit, the number of sheep on farms has also been declining.² Only the number of beef cattle, among the major classes of forage-utilizing livestock, has been increasing, with most of the increase being in the number of cows kept for the production of feeder calves (Table 1).

Many questions have been raised concerning the profitability of beef cattle production in West Virginia and the rate of return which can be realized from an investment of capital in the resources required for the production of feeder calves. Economic and technical changes

¹Research reported herein was done under Hatch Project 165, Evaluation of Alternative Enterprises for West Virginia Farms.

²Barr, A. L., et al., *Sheep Production—Costs and Returns in West Virginia*. W. Va. Univ. Agr. Exp. Sta. Bull. 495, June, 1964.

TABLE 1 *
Number of Forage-Consuming Livestock on West Virginia Farms,
1950, 1960, and 1965

	1950	1960	1965
All Cattle	554,000	540,000	494,000
Kept for Milk	322,000	212,000	167,000
Beef Cows & Heifers	119,000	188,000	205,000
Beef Calves & Steers	104,000	130,000	112,000
Bulls	9,000	10,000	10,000
Sheep	296,000	283,000	213,000

*Source: West Virginia Agr. Stat.—W. Va. Crop Reporting Service, W. Va. Dept. of Agr. and Livestock and Poultry Inventory, January 1—U.S.D.A. Crop Reporting Board, Washington, D. C.

within agriculture also require that beef cattle producers continuously evaluate their production systems and methods and the size of business required to provide an adequate living.

This analysis was undertaken to provide such information to individuals concerned with beef cattle production. The basic data in this analysis are not necessarily representative of any individual production situation. The requirements, cost, and income estimates are designed to reflect typical expectations for long-run average prices, average or normal rainfall conditions and *above average* management. Either higher or lower prices, above or below average rainfall, or more or less efficient management would greatly alter the results for any given year or farm.

Estimates used are based on data obtained from experiments, farmer surveys, and estimates of specialists, scientists, and other experienced persons familiar with beef production in West Virginia. The present analysis is limited to the cow-calf program as other systems require more grain and are not generally as adaptable to West Virginia conditions.

Forage Requirements and Production

Forage production represents the largest single cost item in the production of feeder calves in West Virginia. Winter forage requirements for beef cattle exceed two tons of hay or hay equivalent of silage per cow plus replacements. Thus, a herd of 50 cows with replacements and bulls will require more than 100 tons of hay or hay equivalent of silage. This requirement can be met by using all hay or a combination of hay and silage. For small numbers of cows—50 or fewer head—the cost per ton of forage required of owning both hay and silage equipment is prohibitive. The farmer, from an economic standpoint, with the small number of cattle is likely to have only hay-making equipment, and should consider custom hiring the silo filled if silage is used.

At the present time, the crops which are most likely to be used to meet the hay requirement are: (1) alfalfa-mixed hay, (2) orchardgrass hay, (3) clover-mixed hay, (4) small grain hay or (5) corn silage.

Partial budgets for establishment and harvest of each of these alternatives are presented in tables 2.1 through 2.8. In the budgets, expected yields are for high fertility levels and good management. These and higher yields have been attained consistently in experimental work.

ALFALFA-ORCHARDGRASS HAY

Alfalfa-orchardgrass hay is one of the most commonly found hay crops in West Virginia. It is grown on both bottomland and upland

TABLE 2.1

Alfalfa-Orchardgrass Hay Seeded with Oats: Estimated Establishment Costs*

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre for Establishment:						
Plow	2-14" M.B.	1.0	1.8	1.7	\$.27	\$.46
Disc	8' Tandem	2.0	1.0	1.0	.19	.19
Drag	10' drag	1.0	.6	.6	.05	.03
Fertilize & seed	7' drill	1.0	1.0	.7	.50	.35
Fertilize (Sept.)	7' drill	1.0	1.0	.7	.50	.35
Total			5.4	4.7		\$1.38
Power and Machinery Costs for Establishment:						Per Acre
Tractor (4.7 hours x \$1.20)						\$ 5.64
Other Machinery						1.38
Total Power and Machinery						\$ 7.02
Materials:						
Fertilizer (500# of 0-20-20 at seeding & 200# 0-18-36 in Sept.) ...						\$22.50
Seed (12# Vernal Alfalfa @ \$.80 & 4# Pennlate Orchardgrass @ \$.50)						11.60
Lime (5 ton @ \$6.50)† (over 6-year period)						32.50
Oats (2 bu. @ \$2.00)						4.00
Total Materials Cost						\$70.60
Total Cost						\$77.62
Total Labor						5.4 hours
Establishment Cost Per Ton* (5 tons alfalfa x 5 years + 2 tons oat hay)						\$ 2.88
Labor Per Ton for Establishment						.21 hours

*Excludes fixed costs of machinery and labor. Data derived from unpublished materials, Department of Agricultural Economics, West Virginia University and estimates from Department of Agronomy and Genetics, West Virginia University.

†The price of lime varies greatly among counties, depending on distance from source. The 1961-63 average price paid by West Virginia farmers was \$6.50. The lime requirement will also vary greatly between areas of the State; an estimate of about one ton per acre per year is used for this analysis.

soils. Requirements and costs of establishing alfalfa-orchardgrass hay and oats are presented in Table 2.1. The power and machinery costs included in the budgets include variable costs only, that is, those costs which vary as acreage changes such as gasoline, lubrication, repair and maintenance. Depreciation, taxes, and interest on investment are not included.

Materials listed are those required in the year of seeding except for lime which would be applied as needed in the year of establishment and when needed in subsequent years. To obtain an average yield of five tons per acre per year after the year of establishment and to retain a stand for five years requires good management and high levels of fertility.³

Oats are assumed to be planted with alfalfa as a companion crop. A yield of two tons of hay per acre is estimated for the oat crop. If oats are not seeded with the alfalfa, at least one cutting of alfalfa may be harvested during the year of establishment. Estimated costs of establishing an acre of alfalfa with oats seeded as a companion crop are \$77.62 plus labor. With a yield of two tons of oats and five tons of alfalfa for each of five years, establishment costs are \$2.88 per ton.

Harvest costs for the oat crop, which are presented in Table 2.2, are estimated at \$3.37 plus 2.38 hours of labor per ton. Annual maintenance and harvest costs for alfalfa are listed in Table 2.3. Weevil control and fertilization applications in addition to harvest costs will constitute the annual costs. Total annual costs are estimated to be \$53.54 per acre or \$10.71 per ton of hay plus 4.26 hours of labor. Annual and establishment costs total \$13.59 plus 4.47 hours of labor per ton.

ORCHARDGRASS HAY

The establishment costs for orchardgrass hay are presented in Table 2.4. Again, only variable machinery costs are included in the budgets.

Oats are assumed to be seeded with the orchardgrass as a companion crop at the time of establishment. Without a small grain crop, very little production would be obtained during the first year. Harvest costs and yield for the oat hay would be the same as when seeded with alfalfa (Table 2.2).

Costs of establishing the orchardgrass and oats are estimated at \$70.52. The life of the orchardgrass stand is assumed to be ten years and an average annual yield of four tons is expected with the high

³Establishment costs are high for alfalfa; thus the stand must be retained and high yields obtained to keep establishment costs per ton down. Yields in excess of five tons per acre have been obtained consistently and stands have persisted in excess of six years in trials conducted by scientists of the West Virginia University Department of Agronomy and Genetics.

TABLE 2.2

Harvest Costs of Oat Hay (Seeded with Alfalfa, Clover, or Orchardgrass)*

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Per Acre
Machine and Labor Requirements Per Acre:						
Mow	7' mower	1.0	.5	.5	\$.65	\$.33
Rake	12' rake	1.0	.25	.25	.82	.41
Bale	Pickup baler	1.0	1.0	1.0	.75	.75
Haul & store	Wagon	1.0	3.0	.6	.05	.03
Total			4.75	2.35		\$1.52
Power and Machinery Costs:					Per Acre	
Tractor (2.35 hours x \$1.20)					\$2.82	
Other Machinery					1.52	
Total Power and Machinery					\$4.34	
Materials:						
Baler Twine (\$.03 x 80)					\$2.40	
Total Harvest Cost					\$6.74	
Total Labor					4.75 hours	
Production:						
Oat Hay					2 tons	
Harvest Cost Per Ton					\$3.37	
Labor Per Ton					2.38 hours	

*Excludes fixed costs of machinery, land, and labor.

fertilization rates. Thus, establishment costs per ton are estimated at \$1.86 plus .15 hours labor.

Annual costs of harvest and fertilization are presented in Table 2.5. Total annual costs are estimated to be \$57.39 plus 22 hours of labor per acre. Annual costs per ton are \$14.35 plus 5.5 hours of labor if a yield of four tons per acre is realized. Total costs are \$16.21 plus 5.65 hours of labor per ton.

CLOVER-TIMOTHY HAY

Red clover and timothy constitute the most popular hay mixture grown in West Virginia with 351,000 acres produced in 1963. Costs of establishment of clover and timothy with oats as a companion crop are estimated in Table 2.6. Total costs of establishment are estimated at \$54.72 plus 5.4 hours of labor per acre or \$6.84 plus 0.7 hours of labor per ton. An annual yield of three tons per acre for the clover for two years after establishment and two tons of oat hay during the establishment year are assumed.

TABLE 2.3
Alfalfa-Mixed Hay: Estimated Annual Costs*

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre:						
Spray	Boom spray	2.0	.6	.4	\$.12	\$.03
Fertilize	Drill	2.0	2.0	1.4	.50	.70
Mow	7' mower	4.0	2.0	2.0	.65	1.30
Rake	12' rake	4.0	1.0	1.0	.82	.82
Bale	Pickup baler	4.0	4.0	4.0	.75	3.00
Haul & store	Wagon	4.0	15.0	2.5	.05	.13
Total			21.3	11.3		\$5.98
Power and Machinery Costs:					Per Acre	
Tractor (11.3 hours x \$1.20)					\$13.56	
Other Machinery					5.98	
Total Power and Machinery					\$19.54	
Materials:						
Spray (Guthion 2 pints per acre x 2 appl. @ \$11.00/gal.)					\$ 5.50	
Fertilizer (600# 0-18-36)					22.50	
Baler twine (\$.03 per bale x 200)					6.00	
Total Materials Cost					\$34.00	
Total Annual Cost					\$53.54	
Total Annual Labor					21.3 hours	
Production					5.0 tons	
Annual Cost Per Ton					\$10.71	
Annual Labor Per Ton					4.26 hours	
Establishment Cost Plus Annual Cost Per Ton*					13.59	
Total Labor Per Ton (annual plus establishment)					4.47 hours	

*Excludes fixed costs of machinery, land, and labor.

Harvest costs for the oat hay would be the same as those presented in Table 2.2. Annual costs for the clover-timothy hay are estimated in Table 2.7. Estimated annual and establishment costs are \$16.32 per ton plus 5.2 hours of labor.

CORN SILAGE

Corn silage is used as forage by beef producers throughout the State. In Table 2.8, the costs of producing an acre of corn silage are presented. The machinery costs include only the variable or operating costs. They do not include the fixed costs of machinery ownership. Silage yields are assumed to be 20 tons per acre. Total costs per acre are estimated to be \$68.17 plus 19.8 hours of labor; costs per ton of silage are \$3.40 plus 1 hour of labor.

TABLE 2.4

Orchardgrass Seeded with Oats: Estimated Establishment Costs*

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre for Establishment:						
Plow	2-14" M.B.	1.0	1.8	1.7	\$.27	\$.46
Disc	8' Tandem	2.0	1.0	1.0	.19	.19
Drag	10' drag	1.0	.6	.6	.05	.03
Fertilize						
& seed	7' drill	1.0	1.0	.7	.50	.35
Fertilize	7' drill	1.0	1.0	.7	.50	.35
Total			5.4	4.7		\$1.38
Power and Machinery Costs for Establishment:					Per Acre	
Tractor (4.7 hours x \$1.20)					\$ 5.64	
Other Machinery					1.38	
Total Power and Machinery					\$ 7.02	
Materials:						
Fertilizer: (500# 0-20-20)					\$15.00	
(150# ammonium nitrate)					6.00	
Seed (12# Potomac orchardgrass @ \$.50)					6.00	
Oats (2 bu. @ \$2.00)					4.00	
Lime (5 ton @ \$6.50)					32.50	
Total Materials Cost					\$63.50	
Total Cost					\$70.52	
Total Labor					5.4 hours	
Establishment Cost per Ton:						
(Assuming 10-year life and average annual yield of 4 tons of hay after establishment year or 36 tons + 2 tons oat hay) ..					\$ 1.86	
Labor Per Ton for Establishment (hours)					.15 hours	

*Excludes fixed costs of machinery, land, and labor.

Capital Requirements

Capital requirements for livestock are included in the livestock budgets. Also included are the costs of fence and machinery. Capital required for land, buildings, and operating expenses are not included.

MACHINERY INVESTMENT AND COSTS

Machinery charges used in the forage production budgets are operating costs only. They include the costs of fuel, lubrication, and repair. They do not include the fixed costs of depreciation, interest, housing, insurance, or taxes, as these costs are incurred whether the machinery is used for one hour or a thousand hours per year and do not vary much with use. Some of the machinery is used for several types of operations

TABLE 2.5
Orchardgrass Hay: Estimated Annual Costs *

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre:						
Fertilize	Drill	3	3.0	2.1	\$.50	\$1.05
Mow	7' mower	4	2.0	2.0	.65	1.30
Rake	12' rake	4	1.0	1.0	.82	.82
Bale	Pickup baler	4	4.0	4.0	.75	3.00
Haul & store	Wagon	4	12.0	2.0	.05	.10
Total			22.0	11.1		\$6.27
Power and Machinery Costs Per Year:						Per Acre
Tractor (11.1 hours x \$1.20)						\$13.32
Other Machinery						6.27
Total Power and Machinery						\$19.59
Materials Cost:						
Fertilizer (500# 0-20-20 @ \$3.00)						\$15.00
(450# ammonium nitrate @ \$4.00 cwt.)						18.00
Baler twine (\$.03 per bale x 160 bales)						4.80
Total Materials Cost						\$37.80
Total Annual Cost						\$57.39
Total Annual Labor						22 hours
Production						4 tons
Annual Cost Per Ton						\$14.35
Annual Labor Per Ton						5.5 hours
Establishment Cost Plus Annual Cost Per Ton*						\$16.21
Total Labor Per Ton (annual plus establishment)						5.65 hours

*Excludes fixed costs of machinery, land, and labor.

(for example, the tractor is used for plowing, pulling the wagon, and the manure spreader, etc.) and allocation of the costs among the various uses is difficult. Thus all fixed costs are treated as overhead to the operation of the beef cattle farm. The variable costs which are included in the budgets vary directly with acreages and uses, and are at best only rough estimates as they are influenced by steepness of the land, size of the fields and many other factors which are highly variable from farm to farm.

Table 3.1 lists estimated costs and depreciation for the *minimum* machinery needed for a 50-cow herd assuming that hay alone is produced to meet the forage requirement. With this set of machinery, annual depreciation is \$993, interest on the average investment would be \$349, (assuming a 6 per cent rate) and taxes \$22 (based on a 50 per cent assessed evaluation and a tax rate of 75 cents per \$100 evaluation).

TABLE 2.6

Clover-Timothy Hay Seeded with Oats: Estimated Establishment Costs

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Cost Per Acre
Machine and Labor Requirements Per Acre for Establishment:						
Plow	2-14"	1.0	1.8	1.7	\$.27	\$.46
Disc	8' Tandem	2	1.0	1.0	.19	.19
Drag	10' drag	1.0	.6	.6	.05	.03
Fertilize & seed	7' drill	1.0	1.0	.7	.50	.35
Fertilize	7' drill	1.0	1.0	.7	.50	.35
Total			5.4	4.7		\$1.38
Power and Machinery Costs for Establishment:					Per Acre	
Tractor (4.7 hours x \$1.20)					\$ 5.64	
Other Machinery					1.38	
Total Power and Machinery					\$ 7.02	
Materials:						
Fertilizer (500# 0-20-20)					\$15.00	
Seed (8# clover @ \$.70 & 6# timothy @ \$.60)					9.20	
Lime (3 ton @ \$6.50 over 3-year period)					19.50	
Oats (2 bu. @ \$2.00)					4.00	
Total Materials					\$47.70	
Total Cost					\$54.72	
Total Labor					5.4 hours	
Establishment Cost Per Ton* (3 tons x 2 years + 2 tons oat hay)					\$ 6.84	
Labor Per Ton for Establishment					.7 hours	

*Excludes fixed costs of machinery and labor.

Fixed machinery costs for the 50-cow herd, excluding housing and insurance for the machinery, is \$1,364 or \$27.28 per cow per year.

If silage and hay are both used to meet the forage requirement, additional machinery will be needed for harvesting the silage. Table 3.2 presents the machinery requirement for a 50-cow herd with both silage and hay equipment owned. With this set of machinery, annual depreciation is \$1,377, interest on average machinery investment would be \$485 and taxes \$30. Fixed machinery costs to make hay and silage for the 50-cow herd, excluding insurance and housing, is \$1,892 per year or \$37.84 per cow. This exceeds the cost for the hay-only system by \$10.56 per head.

One way a farmer who desires to feed both hay and silage to a 50-cow herd can reduce the cost is to own the equipment needed specifically for silage jointly with another farmer.⁴ This would reduce the

⁴Purchase of used implements would lower the investment costs, but would likely raise the annual cost of operation as repair costs would probably be greater.

TABLE 2.7
Clover-Timothy Hay: Estimated Annual Costs

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre:						
Fertilize	7' drill	1.0	1.0	.7	\$.50	\$.35
Mow	7' mower	2	1.0	1.0	.65	.65
Rake	12' rake	2	.5	.5	.82	.41
Bale	Pickup baler	2	2.0	2.0	.75	1.50
Haul & store	Wagon	2		1.5	.05	.08
Total			13.5	5.7		\$2.99
Power and Machinery Costs:						Per Acre
Tractor (5.7 hours x \$1.20)						\$ 6.84
Other Machinery						2.99
Total Power and Machinery						\$ 9.83
Materials:						
Fertilizer (500# 0-20-20)						\$15.00
Baler twine (\$.03 x 120)						3.60
Total Materials Cost						\$18.60
Total Annual Cost						\$28.43
Total Annual Labor						13.5 hours
Production						3 tons
Annual Cost Per Ton						\$ 9.48
Annual Labor Per Ton						4.50 hours
Establishment Cost Plus Annual Cost Per Ton						\$16.32
Total Labor Per Ton (annual plus establishment)*						5.2 hours

*Excludes fixed costs of machinery, land, and labor.

average investment to \$6,950 (Table 3.3). Annual depreciation would be \$1,186; interest on investment and taxes would likewise be reduced to \$417 and \$26 respectively. Fixed machinery costs per cow with ½ ownership of silage-producing equipment and full ownership of hay equipment are \$1,629 for the 50-cow herd or \$32.58 per cow per year—\$5.30 more than the hay equipment alone but \$5.26 less than with full ownership of both hay and silage equipment.

As the basic set of machinery listed is the minimum required for producing hay and silage whether an individual has 30 cows or 50, the total investment in machinery can be reduced only by joint ownership or custom work. Many farmers are unwilling to own machinery jointly or custom-hire work due to timeliness of operation, and other reasons. Thus, their alternative is to spread the given machinery costs over a greater number of cows. Tables 3.4 and 3.5 present the machinery investment for a herd of 100 cows using hay only and hay and silage for

TABLE 2.8
Corn Silage: Estimated Costs*

Operation	Equipment	Times Over	Labor Hours/Acre	Tractor Hours/Acre	Equipment Cost Per Hour	Equipment Cost Per Acre
Machine and Labor Requirements Per Acre:						
Fertilize	7' drill	1.0	.7	.7	\$.50	\$.35
Plow	2-14"	1.0	1.8	1.7	.27	.46
Disc	8' Tandem	2.0	1.0	1.0	.19	.19
Plant & fertilize	2 row	1.0	1.0	.8	.30	.24
Spray	Boom	1.0	.6	.4	.12	.05
Cultivate	2 row	1.0	.7	.7	.40	.28
Harvest	Field chopper		4.0	3.6	.60	2.16
Haul & store	Self-unloading Wagon				.16	.64
	Forage Blower	1.0	10.0	6.0	.73	1.92
Total			19.8	14.9		\$6.29
Power and Machinery Costs:					Per Acre	
Tractor (14.9 hours x \$1.20)					\$17.88	
Other Machinery					6.29	
Total Power and Machinery					\$24.17	
Materials:						
Lime (one ton per year)					\$ 6.50	
Seed (18# x \$.18)					3.25	
Fertilizer (500# 10-20-10 @ \$84.00/ton + 150# ammonium nitrate @ \$80.00)					27.00	
Chemical (2.5# atrazine — 80% Wettable Powder @ \$2.90) ...					7.25	
Total Materials Cost					\$44.00	
Total Cost					\$68.17	
Total Labor					19.8 hours	
Production of Silage					20 tons	
Total Cost Per Ton Excluding Fixed Cost of Machinery and Labor					\$ 3.40	
Labor Per Ton					1.0 hour	

*Excludes fixed costs of machinery, land, and labor.

forage. The only additional equipment necessitated to produce the forage and to perform other operations for a 100-cow herd would be an additional tractor and wagon and perhaps a larger pickup truck. If hay alone is produced for forage, annual fixed machinery costs are \$1,273 for depreciation, \$464 for interest and \$29 for taxes—a total of \$1,766 for the 100-cow herd. The fixed machinery cost per cow is \$17.66 or \$9.62 less per cow than the cost for a 50-cow herd. If both hay and silage are produced and full ownership of all machinery is assumed, annual machinery depreciation is \$1,657, interest \$600, and taxes \$38, or a total of \$2,295 for the 100-cow herd or \$22.95 per cow.

TABLE 3.1
Machinery for 50-Cow Herd
(Hay Only)

Machine	Cost	Average Value	Estimated Years Life*	Annual Deprec.
Tractor	\$ 3,200	\$1,600	15	\$ 213
Plow	300	150	15	20
Disc	330	165	15	22
Grain Drill	650	325	20	32
Sprayer	200	100	10	20
Mower	540	270	12	45
Rake	560	280	12	47
Baler	2,300	1,150	10	230
Wagon	250	125	15	17
Manure Spreader	600	300	15	40
Manure Loader	300	150	10	30
Elevator	400	200	15	27
Truck (½ Ton)	2,000	1,000	8	250
Total	\$11,630	\$5,815		\$ 993
Interest on average investment (6% x \$5,815)				\$ 349
Taxes (½ of average value x 75 cents per \$100 or \$29 x .75)				22
Total fixed machinery cost per year				\$1,364
Fixed cost per cow per year				\$ 27.28

*Source: *Agricultural Engineers' Yearbook*, 1962, 1964.

LAND INVESTMENT

The land requirement per cow is highly variable in West Virginia, depending upon many factors. Chief among these factors are topography fertility, rainfall, elevation, plant species and management. These factors vary greatly among areas of the State and also among farms within any given area. Cropland and pasture land requirements and corresponding investments are estimated in Table 4.

Cropland Requirements

For any given farm, the amount of cropland required will be influenced not only by the productivity of the land and average rainfall, but by the selection of crops used alone or in rotation to produce the forage required by the herd. If corn silage, oats and alfalfa-mixed hay are produced in rotation—1/7 of the cropland in corn, 1/7 in oats seeded with alfalfa and cut for hay, and 5/7 in alfalfa-mixed hay—and average yields are those estimated in the crop budgets, the cropland requirement is approximately 42 acres per 100 cows. If alfalfa-mixed hay alone is produced with oats seeded as a nurse crop and cut for hay,

TABLE 3.2
Machinery for 50-Cow Herd
(Silage & Hay)

Machine	Cost*	Average Value	Estimated Years Life†	Annual Deprec.
Tractor	\$ 3,200	\$1,600	15	\$ 213
Plow	300	150	15	20
Disc	330	165	15	22
Grain Drill	650	325	20	32
Sprayer	200	100	10	20
Mower	540	270	12	45
Rake	560	280	12	47
Baler	2,300	1,150	10	230
Wagon	250	125	15	17
Manure Spreader	600	300	15	40
Manure Loader	300	150	10	30
Elevator	400	200	15	27
Field Chopper	2,000	1,000	10	200
Forage Blower	950	475	12	79
Self Unloading Wagon	950	475	15	63
Corn Planter	330	165	20	16
Cultivator	310	155	12	26
Truck (½ Ton)	2,000	1,000	8	250
Total	\$16,170	\$8,085		\$1,377
Interest on average investment (6% x \$8,085)				\$ 485
Taxes (½ of average investment x \$.75 per \$100 or \$40.82 x \$.75)				30
Total fixed machinery cost per year				\$1,892
Fixed cost per cow per year				\$ 37.84

*Source: *Agricultural Engineers' Yearbook*, 1962, 1964.

the cropland requirement is about 44 acres per 100 cows. If the rotation is corn silage, oats and clover-mixed hay, the requirement is about 55 acres per 100 cows. The cost of cropland will also vary greatly between and within areas depending upon productivity, slope and location. In this analysis an average value of \$400 per acre is assumed for cropland from which yields equivalent to those assumed in the budgets can be obtained.

Pasture Land Requirements

Pasture land requirements will vary even more than cropland requirements with the acreage required depending upon fertility level, plant species, soil type, rainfall, and many other factors. In the limestone areas with average rainfall and high fertility, two acres of pasture land per cow in the herd should be adequate to provide pasture for seven months each year. However, in other areas with unimproved pastures this requirement may exceed six acres or more per cow. The initial cost

TABLE 3.3

Machinery for 50-Cow Herd (Assuming Silage and Hay With All of Hay Equipment and ½ of Silage Equipment Owned)

Machine	Cost*	Average Value	Estimated Years Life†	Annual Deprec.
Tractor	\$ 3,200	\$1,600	15	\$ 213
Plow	300	150	15	20
Disc	330	165	15	22
Grain Drill	650	325	20	32
Sprayer	200	100	10	20
Mower	540	270	12	45
Rake	560	280	12	47
Baler	2,300	1,150	10	230
Wagon	250	125	15	17
Manure Spreader	600	300	15	40
Manure Loader	300	150	10	30
Elevator	400	200	15	27
Truck (½ Ton)	2,000	1,000	8	250
Field Chopper (½)	1,000	500	10	100
Forage Blower (½)	475	238	12	40
Self Unloading Wagon (½)	475	237	15	32
Corn Planter (½)	165	83	20	8
Cultivator (½)	155	77	12	13
Total	\$13,900	\$6,950		\$1,186
Interest on average investment (6% x \$6,950)				\$ 417
Taxes (½ of average investment x \$.75 per \$100 or \$34.75 x \$.75)				26
Total fixed machinery cost per year				\$1,629
Fixed cost per cow per year				\$ 32.58

*Cost for owned share.

†Source: *Agricultural Engineers' Yearbook*, 1962, 1964.

for land will be less for a herd of a given size if recommended fertilization and liming practices are to be followed, but the annual costs of improvements will have to be incurred.

FENCE COSTS

Estimated costs of fencing the land required for a 50-cow herd are presented in Table 5. Fencing requirements are based on the assumptions that: (1) 21 acres of cropland and 150 acres of pasture land are fenced, (2) the average-sized field of cropland is 7 acres, (3) the pasture is divided into three fields approximately equal in size, and (4) that roads, woodland, etc., would require that the farmer build all of the boundary fence on two sides and would share the building of the other two sides with neighbors. The miles of fence required for this land area would vary depending upon the size of fields and shape of the farm; however, to

TABLE 3.4
Minimum Machinery for a 100-Cow Herd
(Hay Only)

Machine	Cost	Average Value	Estimated Years Life*	Annual Deprec.
2 Tractors	\$ 6,400	\$3,200	15	\$ 427
Plow	300	150	15	20
Disc	330	165	15	22
Grain Drill	650	325	20	32
Sprayer	200	100	10	20
Mower	540	270	12	45
Rake	560	280	12	47
Baler	2,300	1,150	10	230
2 Wagons	500	250	15	33
Manure Spreader	600	300	15	40
Manure Loader	300	150	10	30
Elevator	400	200	15	27
Truck (¾ Ton)	2,400	1,200	8	300
Total	\$15,480	\$7,740		\$1,273
Interest on average investment (6% x \$7,740)				\$ 464
Taxes (½ of average investment x \$.75 per \$100 or \$38.70 x \$.75)				29
Total fixed machinery cost per year				\$1,766
Fixed cost per cow per year				\$ 17.66

*Source: *Agricultural Engineers' Yearbook*, 1962, 1964.

fence the land area required for a 50-cow herd would require approximately 3 miles of fence.

In reality, only a part of this fence would be built each year, but the life of the posts and fence normally require that all of it be replaced in a period of 20 years. Annual repairs will also be required; these are estimated to require 10 hours of labor and \$2.50 for materials per mile annually. The estimated annual cost to establish and maintain a fence is \$2.40 per cow.

BUILDING INVESTMENT

Farm buildings found on beef cattle farms in West Virginia range from large masonry barns and large automatic feeding silos to open sheds with trench silos or converted dairy barns. Thus, the existing investment in buildings is highly variable. On most farms in West Virginia with a minimum of 50 cows, existing barns are more than adequate, and in many cases have been fully depreciated. The investment required and annual cost of maintaining adequate buildings for a 50-cow herd are shown in Table 6. A total investment of \$110 per cow in buildings and

TABLE 3.5
Minimum Machinery for a 100-Cow Herd
(Silage & Hay)

Machine	Cost	Average Value	Estimated Years Life*	Annual Deprec.
2 Tractors	\$6,400	\$ 3,200	15	\$ 427
Plow	300	150	15	20
Disc	330	165	15	22
Grain Drill	650	325	20	32
Sprayer	200	100	10	20
Mower	540	270	12	45
Rake	560	280	12	47
Baler	2,300	1,150	10	230
2 Wagons	500	250	15	33
Manure Spreader	600	300	15	40
Manure Loader	300	150	10	30
Elevator	400	200	15	27
Field Chopper	2,000	1,000	10	200
Forage Blower	950	475	12	79
Self Unloading Wagon	950	475	15	63
Corn Planter	330	165	20	16
Cultivator	310	155	12	26
Truck (¾ Ton)	2,400	1,200	8	300
Total	\$20,020	\$10,010		\$1,657
Interest on average investment (6% x 10,010)				\$ 600
Taxes (½ of average investment x \$.75 per \$100 or \$50.05 x \$.75)				38
Total fixed machinery cost per year				\$2,295
Fixed cost per cow per year				\$ 22.95

*Source: *Agricultural Engineers' Yearbook*, 1962, 1964.

silos is estimated, or a cost of \$8.60 per cow year to depreciate the buildings in 30 years, obtain a return of 6 per cent on the average investment, and to pay taxes, insurance, and repairs. If the silo is omitted, the investment is \$80 per cow or a cost of \$6.26 per cow per year.

BULL DEPRECIATION

In the livestock budgets, the cost of bulls is assumed to be \$500, and it is assumed that the bulls have an average of four years useful service. The salvage value is assumed to be \$256 (1,600 pounds x 16 cents per pound). Thus, the average value is about \$375 and annual depreciation is \$61 per bull.

Gross Income

Gross income from a beef cow herd of given size varies greatly from year to year. Weight of calves sold and price received per pound are the two factors which are chiefly responsible for this variation.

TABLE 4
Estimated Land Investment for a 100-Cow Herd*

Cropland: 50 acres @ \$400/acre \$20,000				
Pasture Land:		Type of Soil		
	Improved Limestone	Unimproved Limestone	Improved Non-Limestone	Unimproved Non-Limestone
Acres Needed	200	400	300	600
Estimated Cost per Acre Before Improved	80	80	50	50
Pasture Land Invest.	\$16,000	\$32,000	\$15,000	\$30,000
Improvement Practice/Acre	400# 10-20-0 per 4 years	0	300# 14-56-0 plus 2 tons lime per 4 years	0
Estimated Cost of Improvement/acre/year	\$3.20	0	\$7.50	0
Cost to Farmer Assuming ACP Payment of 50 Per Cent	\$1.60		\$3.75	
Alternative Land Investments:				
(1) 50 acres Cropland and 200 acres Improved Limestone				\$36,000
(2) 50 acres Cropland and 300 acres Unimproved Limestone				52,000
(3) 50 acres Cropland and 300 acres Improved Non-Limestone				35,000
(4) 50 acres Cropland and 600 acres Unimproved Non-Limestone ..				50,000

*Land requirements for a 50-cow herd would be just about 1/2 that for the 100-cow herd.

TABLE 5
Estimated Costs of Fencing Pasture and Cropland Required for a 50-Cow Beef Herd

Item	Unit	Quantity	Price	Cost
Barbed Wire*	Miles	3	\$ 44.00**	\$ 132.00
Woven Wire	Miles	3	320.00***	960.00
Locust Posts	Number	1,320†	.40	528.00
Corner Braces	Number	40	.50	20.00
Gates	Number	8	20.00	160.00
Staples	Pounds	100	.20	20.00
Labor	Hours	600	.75	450.00
Total of Specified Construction Costs				\$2,270.00
Annual Costs:				
Depreciation††				\$ 113.50
Annual Repair	Mile	3	2.50	7.50
Labor	Mile	3	10 hours	
Total Specified Annual Cost (excluding labor)				\$ 121.00
Annual Cost Per Cow (excluding annual labor)				2.40

*Assumes a single strand of barbed wire over 39-inch woven wire.

**Assumes a price of \$11.00 per 80-rod roll and 4 rolls per mile.

***Assumes a price of \$20.00 per 20-rod roll and 16 rolls per mile.

†Assumes a 12-foot spacing.

††Assumes an average life of 20 years.

TABLE 6
Building Investment for a 50-Cow Beef Herd

Barn (40 sq. ft./cow @ \$2.00 sq. ft.)	\$4,000.00	
Silo	1,500.00	
Total	\$5,500.00	
Annual Costs:		
	With Silo	Without Silo
Depreciation (assuming a 30-year life)	\$ 183.00	\$133.00
Interest on Average Investment*	165.00	120.00
Taxes & Insurance†	82.00	60.00
Total Annual Costs	\$ 430.00	\$313.00
Annual Cost per Cow	8.60	6.26

*Assuming an interest rate of 6 per cent on one-half investment.

†Assuming a rate of 3 per cent of average investment.

WEIGHT

The variation in the weight of calves available for sale from a herd is caused by (1) weather which affects the quantity and quality of forage available and (2) the number of calves weaned. The farmer cannot control the weather, but he can control stocking rate, improve pastures, breed the herd earlier, and use other measures such as creep feeding which will increase calf weights.

PRICE

The price received per pound for calves sold is affected by (1) the quality of calves sold, (2) average weight of calves sold, and (3) the demand for and supply of calves. The individual farmer can in various ways influence both the quality and weight of calves he sells, but, individually, he can have little if any influence on either the supply or demand factors affecting price.

The effects of the per cent calf crop, the weight of calves and price received per pound on the gross return per cow in the herd are indicated in Tables 7.1, 7.2, and 7.3. With a 90 per cent calf crop, an average calf weight of 400 pounds and an average price of 25 cents per pound, gross returns per cow in the herd would be \$90; with a calf crop of 85 per cent, and the same weight and price, gross returns would be \$85 per cow in the herd. At higher prices and heavier average weights, the difference in actual dollar gross returns per cow due to the per cent calf crop is also greater. An increase in the average weight of calves, assuming price and per cent calf crop remain unchanged will also greatly increase gross returns per cow. With a 90 per cent calf crop and an average price of 25 cents per pound, gross returns per cow in the herd increase \$5.62 for each 25-pound increase in the average weight of calves sold.

TABLE 7.1
Gross Return Per Cow of Breeding Age (90 Per Cent Calf Crop*)

Weight	Average Price (¢)												
	18	19	20	21	22	23	24	25	26	27	28	29	30
325	52.65	55.58	58.50	61.42	64.35	67.28	70.20	73.12	76.05	78.98	81.90	84.82	87.75
350	56.70	59.85	63.00	66.15	69.30	72.45	75.60	78.75	81.90	85.05	88.20	91.35	94.50
375	60.75	64.12	67.50	70.88	74.25	77.62	81.00	84.38	87.75	91.12	94.50	97.88	101.25
400	64.80	68.40	72.00	75.60	79.20	82.80	86.40	90.00	93.60	97.20	100.80	104.40	108.00
425	68.85	72.68	76.50	80.32	84.15	87.98	91.80	95.62	99.45	103.28	107.10	110.92	114.75
450	72.90	76.95	81.00	85.05	89.10	93.15	97.20	101.25	105.30	109.35	113.40	117.45	121.50
475	76.95	81.22	85.50	89.78	94.05	98.32	102.60	106.88	111.15	115.42	119.70	123.98	128.25
500	81.00	85.50	90.00	94.50	99.00	103.50	108.00	112.50	117.00	121.50	126.00	130.50	135.00
525	85.05	89.78	94.50	99.22	103.95	108.68	113.40	118.12	122.85	127.58	132.30	137.02	141.75
550	89.10	94.05	99.00	103.95	108.90	113.85	118.80	123.75	128.70	133.65	138.60	143.55	148.50

*Calf Crop—Calves reaching market weight per 100 cows of breeding age.

TABLE 7.2
Gross Return Per Cow of Breeding Age (85 Per Cent Calf Crop*)

Weight	Average Price (¢)												
	18	19	20	21	22	23	24	25	26	27	28	29	30
325	49.72	52.49	55.25	58.01	60.78	63.54	66.30	69.06	71.82	74.59	77.35	80.11	82.88
350	53.55	56.52	59.50	62.48	65.45	68.42	71.40	74.37	77.35	80.32	83.30	86.28	89.25
375	57.38	60.56	63.75	66.94	70.12	73.31	76.50	79.69	82.88	86.06	89.25	92.44	95.62
400	61.20	64.60	68.00	71.40	74.80	78.20	81.60	85.00	88.40	91.80	95.20	98.60	102.00
425	65.02	68.64	72.25	75.86	79.48	83.09	86.70	90.31	93.92	97.54	101.15	104.76	108.38
450	68.85	72.68	76.50	80.32	84.15	87.98	91.80	95.62	99.45	103.28	107.10	110.92	114.75
475	72.68	76.71	80.75	84.79	88.82	92.86	96.90	100.94	104.98	109.01	113.05	117.09	121.12
500	76.50	80.75	85.00	89.25	93.50	97.75	102.00	106.25	110.50	114.75	119.00	123.25	127.50
525	80.32	84.79	89.25	93.71	98.18	102.64	107.10	111.56	116.02	120.49	124.95	129.41	133.88
550	84.15	88.82	93.50	98.18	102.85	107.52	112.20	116.88	121.55	126.22	130.90	135.58	140.25

*Calf Crop—Calves reaching market weight per 100 cows of breeding age.

TABLE 7.3
Gross Return Per Cow of Breeding Age (80 Per Cent Calf Crop*)

Weight	Average Price (¢)													
	18	19	20	21	22	23	24	25	26	27	28	29	30	
325	46.80	49.40	52.00	54.60	57.20	59.80	62.40	65.00	67.60	70.20	72.80	75.40	78.00	
350	50.40	53.20	56.00	58.80	61.60	64.40	67.20	70.00	72.80	75.60	78.40	81.20	84.00	
375	54.00	57.00	60.00	63.00	66.00	69.00	72.00	75.00	78.00	81.00	84.00	87.00	90.00	
400	57.60	60.80	64.00	67.20	70.40	73.60	76.80	80.00	83.20	86.40	89.60	92.80	96.00	
425	61.20	64.60	68.00	71.40	74.80	78.20	81.60	85.00	88.40	91.80	95.20	98.60	102.00	
450	64.80	68.40	72.00	75.60	79.20	82.80	86.40	90.00	93.60	97.20	100.80	104.40	108.00	
475	68.40	72.20	76.00	79.80	83.60	87.40	91.20	95.00	98.80	102.60	106.40	110.20	114.00	
500	72.00	76.00	80.00	84.00	88.00	92.00	96.00	100.00	104.00	108.00	112.00	116.00	120.00	
525	75.60	79.80	84.00	88.20	92.40	96.60	100.80	105.00	109.20	113.40	117.60	121.80	126.00	
550	79.20	83.60	88.00	92.40	96.80	101.20	105.60	110.00	114.40	118.80	123.20	127.60	132.00	

*Calf Crop—Calves reaching market weight per 100 cows of breeding age.

Normally, the average price which buyers are willing to pay for a given quality of calves declines as weight increases. The exact amount that buyers discount calves due to heavier weight has not been determined. However, it has been estimated that calves with an average weight of 350 pounds will normally sell for one cent per pound more than equal-quality calves with an average weight of 425 pounds (range 400 to 450 pounds). Likewise, calves with an average weight of 425 pounds will normally sell for one cent per pound more than equal-quality calves with an average weight of 475 pounds (range 450 to 500 pounds). Calves with an average weight of 550 will sell for about $\frac{1}{2}$ cent per pound less than 450- to 500-pound calves.

Feeder calves sold through the cooperative feeder calf sales in the years 1955 to 1964 had an average weight of 420 pounds and sold for an average price of \$23.91 per hundred weight or \$100.42 per head (Table 8). If these calves would have had an average weight of 470 pounds and been of the same quality, the average price received would have been approximately one cent per pound less or \$22.91, but would have had an average value of \$107.68 per head. With a calf crop of 90 per cent, gross returns per cow in the herd—assuming all calves from a herd to be of equal weight and quality to those going through the feeder calf sales—were approximately \$90. With an 80 per cent calf crop, returns were only \$80 per cow.

Returns to Owned Factors

In the livestock budgets, tables 9.01 to 9.12, returns are stated as returns to owned factors used in production. These factors are assumed to be capital invested in land, buildings, livestock, and labor and management. Thus, these returns are the amount by which gross returns exceed cash expenses and machinery depreciation. Only those expenses which a farmer must meet over a period of years have been deducted. A farmer who owns his land has adequate buildings, furnishes all or a major portion of the labor and management required, may rely on this residual for his living. Returns to management and risk can be estimated by deducting an interest cost for capital invested in land, buildings, and livestock and a charge for labor.

TABLES 9.01, 9.02, AND 9.03

In Table 9.01, the production requirements and income are presented for a 50-cow herd with a winter ration of hay only. An 80 per cent calf crop is assumed with calves reaching an average market weight of 420 pounds by October 15.

TABLE 8
**Number, Weight, Price, and Value of Calves Sold Through West Virginia Demonstrational Feeder
 Calf Sales, 1955-1964**

Year	Steers				Heifers				All Calves			
	Number	Avg. Weight	Avg. Price Per Cwt.	Number	Avg. Weight	Avg. Price Per Cwt.	Number	Avg. Weight	Avg. Price Per Cwt.	Avg. Value Per Head		
1955	3,951	435	\$22.23	2,637	410	\$16.93	6,588	425	\$20.26	\$ 86.11		
1956	4,902	436	20.60	3,259	415	15.30	8,161	428	18.55	79.39		
1957	4,083	421	23.91	2,857	400	19.22	6,940	412	22.05	90.85		
1958	3,832	437	32.60	2,811	412	27.34	6,643	426	30.49	129.89		
1959	4,716	427	30.17	3,197	402	25.34	7,913	417	28.27	117.89		
1960	6,416	433	25.24	4,447	414	21.21	10,863	425	23.45	99.66		
1961	6,672	436	27.26	4,715	408	22.71	11,387	424	25.48	108.04		
1962	7,585	423	29.47	5,633	399	24.05	13,218	413	27.26	112.58		
1963	9,437	430	26.27	7,349	402	22.11	16,786	418	24.52	102.49		
1964	11,265	430	22.57	8,643	404	18.04	19,908	419	20.67	86.61		
Avg.	—	430	\$25.84	—	406	\$21.08	—	420	\$23.91	\$100.42		

Source: Computed from data published in "Field Worker's Blue Book, Livestock Program" 1960-1965. Cooperative Extension Service, West Virginia University.

TABLE 9.01

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Winter Ration of Alfalfa-Mixed Hay; Assuming 80 Per Cent Calf Crop; Selling Feeder Calves Averaging 420 Pounds, October 15

LIVESTOCK INVESTMENT				
Item	Head	Animal Units	Value Per Head	Total Value
Brood cows	50	50	\$175.00	\$ 8,750.00
Bulls	2	2	378.00	756.00
Heifers, more than 1 year ..	8	4	140.00	1,120.00
Heifers, less than 1 year ...	8	2	100.00	800.00
Total	68	58		\$11,426.00

SALES

Item	Head	Weight	Price	Value Per Head	Total Value
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00
Heifer calves	12*	405	21.08	85.37	1,024.44
Steer calves	20	430	25.84	111.11	2,222.20
Total Receipts					\$4,296.64

INPUT ITEMS

Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	50	150	\$ —	\$ —
Hay (mixed alfalfa) ..	tons			105	13.59**	1,426.95
Minerals and salt	lbs.	30	50	1,500	.03	45.00
Vet. and med.	\$	2.00	58	\$ 116.00		116.00
Bull depreciation	\$	61.00	2	\$ 122.00		122.00
Hauling & marketing	cwt.		204		.75	153.00
Tax on livestock	\$100 assessed					
	Eval.†	.70	57			39.90
Machinery	\$/cow	27.28	50	\$1,364.00		1,364.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,386.85
Returns to Owned Factors						\$ 909.79
Returns Per Cow Above Specified Costs						\$ 18.20

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

The livestock investment consists of 50 cows with an average value of \$175, two bulls with an average value of \$378 (\$500 cost and \$256 salvage), 8 heifers more than one year old and 8 heifers less than one year old. The total livestock investment is estimated at \$11,426.

Sales consist of 7 cull cows, 12 heifer calves and 20 steer calves. With prices at the level received through the cooperative feeder calf sales, total sales would be \$4,296.64. Eight heifers are kept to replace the seven cows sold each year.

TABLE 9.02

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Winter Ration of Alfalfa-Mixed Hay; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 420 Pounds, October 15

LIVESTOCK INVESTMENT				
Item	Head	Animal Units	Value Per Head	Total Value
Brood cows	50	50	\$175.00	\$ 8,750.00
Bulls	2	2	378.00	756.00
Heifers, more than 1 year ..	8	4	140.00	1,120.00
Heifers, less than 1 year ...	8	2	100.00	800.00
Total	68	58		\$11,426.00

SALES

Item	Head	Weight	Price	Value Per Head	Total Value
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00
Heifer calves	14*	405	21.08	85.37	1,195.18
Steer calves	23	430	25.84	111.11	2,555.53
Total Receipts					\$4,800.71

INPUT ITEMS

Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	50	150	\$ —	\$ —
Hay	tons			105	13.59**	1,426.95
Minerals and salt ...	lbs.	30	50	1,500	.03	45.00
Vet. and med.	\$	2.00	58	\$ 116.00		116.00
Bull depreciation	\$	61.00	2	\$ 122.00		122.00
Hauling & marketing	cwt.		226		.75	169.50
Tax on livestock	\$100 assessed eval.†	.70	57	\$ 39.90		39.90
Machinery	\$/cow	27.28	50	\$1,364.00		1,364.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,403.35
Returns to Owned Factors						\$1,397.36
Returns Per Cow Above Specified Costs						\$ 27.95

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

Requirements are estimated to be 150 acres of pasture, 105 tons of hay, 1,500 pounds of mineralized salt, and \$2.00 per animal unit for veterinary and medical expenses. Bull depreciation at \$61.00 per bull, a hauling and marketing cost of 75 cents per hundred weight marketed, taxes on livestock of \$.70 per \$100 assessed evaluation, and a fencing cost of \$2.40 per cow constitute other costs which will be incurred. Total costs are \$3,386.85, exclusive of pasture costs, labor, land costs, and

TABLE 9.03

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Selling Feeder Calves, Winter Ration of Alfalfa-Mixed Hay; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 470 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units	Value Per Head	Total Value		
Brood cows	50	50	\$175.00	\$ 8,750.00		
Bulls	2	2	378.00	756.00		
Heifers, more than 1 year ..	8	4	140.00	1,120.00		
Heifers, less than 1 year ...	8	2	100.00	800.00		
Total	68	58		\$11,426.00		
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00	
Heifer calves	14*	455	20.08	91.36	1,279.04	
Steer calves	23	485	24.84	120.47	2,770.81	
Total Receipts					\$5,099.85	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	50	150	\$ —	\$ —
Hay	tons			111	13.59**	1,508.49
Minerals and salt	lbs.	30	50	1,500	.03	45.00
Vet. and med.	\$	2.00	58	\$ 116.00		116.00
Bull depreciation	\$	61.00	2	\$ 122.00		122.00
Hauling & marketing	cwt.		245	\$ 183.75	.75	183.75
Tax on livestock	\$100 assessed					
	eval.†	.70	57	\$ 39.90		39.90
Machinery	\$/cow	27.28	50	\$1,364.00		1,364.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,499.14
Returns to Owned Factors						\$1,600.71
Returns Per Cow Above Specified Costs						\$ 32.01

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

return on investment in livestock and real estate. Returns from sales exceed specified costs by \$909.79 for a 50-cow herd or \$18.20 per cow. This represents a return to the labor, land, buildings, livestock investment, and management.

In Table 9.02 the effect of increasing the calf crop from 80 to 90 per cent is shown. Livestock investment and most costs remain about the same, but income is increased by more than \$500. Returns per cow

are increased by approximately \$10 per cow over the herd with an 80 per cent calf crop.

In Table 9.03, the effect of increasing the weight of calves sold by 50 pounds per calf is shown with a 90 per cent calf crop. With price reduced by one cent per pound, the heavier calves increase total sales from the 50-cow herd by \$300. The only costs assumed to be increased to get the additional 50 pounds of weight per calf are the hay costs and marketing costs. Calves must be born earlier if they are to weigh an extra 50 pounds by October 15 without grain feeding. Extra hay is included for the 45 calves.

The additional cost of producing and marketing calves weighing 50 pounds more per head would be \$96 or \$203 less for the 50-cow herd than the increased sales. The returns per cow above specified costs are increased by \$4.06 per cow by increasing the weight of calves by 50 pounds.

TABLES 9.04, 9.05, AND 9.06

In Tables 9.04, 9.05, and 9.06, production requirements and income estimates are presented for a 50-cow herd with hay and silage each comprising $\frac{1}{2}$ of the dry matter in the ration. The assumption is made that the farmer owns 100 per cent of the machinery. In Table 9.04 an 80 per cent calf crop is assumed with calves averaging 420 pounds at market. In Tables 9.05 and 9.06 a 90 per cent calf crop is assumed with calves averaging 420 pounds in Table 9.05 and 470 pounds in Table 9.06. The machinery cost is increased by \$528 above the hay-only feeding system in Tables 9.01, 9.02 and 9.03. This is only partially offset by the lower cost of producing the silage; thus, returns above specified costs are about \$7 per head less than for the hay-only systems.

For the individual with only a 50-cow herd, ownership of both hay and silage equipment is not economical unless he can increase the tonnage of silage harvested each year by custom work or unless other economies are effected. The alternative is to own the hay equipment and get the silos custom filled.

TABLES 9.07, 9.08, AND 9.09

In Tables 9.07, 9.08, and 9.09, production requirements and income are presented for a 100-cow herd with a winter ration of hay only. The three situations budgeted are indential to those presented in Tables 9.01, 9.02, and 9.03, except that the herd is twice as large. The sales and livestock investment are doubled, but costs, although increased, are not twice as great as for a 50-cow herd. Income above specified costs per cow for the hay-only systems with a 100-cow herd is nearly \$10 per head

TABLE 9.04

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Winter Ration of Alfalfa-Mixed Hay and Silage; Assuming 80 Per Cent Calf Crop; Selling Feeder Calves Weighing 420 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units	Value Per Head	Total Value		
Brood cows	50	50	\$175.00	\$ 8,750.00		
Bulls	2	2	378.00	756.00		
Heifers, more than 1 year ..	8	4	140.00	1,120.00		
Heifers, less than 1 year ...	8	2	100.00	800.00		
Total	68	58		\$11,426.00		
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00	
Heifer calves	12*	405	21.08	85.37	1,024.44	
Steer calves	20	430	25.84	111.11	2,222.20	
Total Receipts					\$4,296.64	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Minerals and salt ...	acres	3	50	150	\$ —	\$ —
Vet. and med.	tons		52.5		13.59**	713.48
Bull depreciation ...	tons		157.5		3.40**	535.50
Hauling & marketing	lbs.	30	50	1,500	.03	45.00
Pasture	\$	2.00	58	\$ 116.00		116.00
Hay	\$	61.00	2	\$ 122.00		122.00
Silage	cwt.		204		.75	153.00
Tax on livestock	\$100 assessed					
	eval.†	.70	57	\$ 39.90		39.90
Machinery	\$/cow	\$37.84	50	\$1,892.00		1,892.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,736.88
Returns to Owned Factors						\$ 559.76
Returns Per Cow Above Specified Costs						\$ 11.20

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

more than for the corresponding 50-cow herd. This reduction is largely due to more efficient use of machinery.

In Table 9.07 computations are based on an 80 per cent calf crop and average selling weights of 420 pounds. Returns per cow above specified costs are \$27.81. With a 90 per cent calf crop returns above costs are increased to \$37.57 per cow (Table 9.08). With a 90 per cent calf crop and a 470-pound average selling weight of calves, returns above specified costs are \$41.63 (Table 9.09).

TABLE 9.05

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Winter Ration Hay and Silage; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 420 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units		Value Per Head	Total Value	
Brood cows	50	50		\$175.00	\$ 8,750.00	
Bulls	2	2		378.00	756.00	
Heifers, more than 1 year ..	8	4		140.00	1,120.00	
Heifers, less than 1 year ...	8	2		100.00	800.00	
Total	68	58			\$11,426.00	
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00	
Heifer calves	14*	405	21.08	85.37	1,195.18	
Steer calves	23	430	25.84	111.11	2,555.53	
Total Receipts					\$4,800.71	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	50	150	\$ —	\$ —
Hay	tons		52.5	52.5	13.59**	713.48
Silage	tons		157.5		3.40**	535.50
Minerals and salt	lbs.	30	50	1,500	.03	45.00
Vet. and med.	\$	2.00	58	\$ 116.00		116.90
Bull depreciation	\$	61.00	2	\$ 122.00		122.00
Hauling & marketing	cwt.		226		.75	169.50
Tax on livestock	\$100 assessed					
	eval.†	.70	57	\$ 39.90		39.90
Machinery	\$/cow	37.84	50	\$1,892.00		1,892.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,753.38
Returns to Owned Factors						\$1,047.33
Returns Per Cow Above Specified Costs						\$ 20.95

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

TABLES 9.10, 9.11, AND 9.12

In Tables 9.10, 9.11, and 9.12, production requirements and income are presented for a 100-cow herd with $\frac{1}{2}$ of the forage requirement being provided from silage and $\frac{1}{2}$ from hay (assuming 3 tons of silage equal to 1 ton of hay). With a beef herd as large as 100 head, hay and silage equipment can almost be as economically owned as can hay equipment alone. The additional cost of owning the silage equipment can almost

TABLE 9.06

Estimated Production Requirements and Income for a Beef Herd of 50 Cows; Winter Ration of Alfalfa-Mixed Hay and Silage; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 470 Pounds, October 15

LIVESTOCK INVESTMENT				
Item	Head	Animal Units	Value Per Head	Total Value
Brood cows	50	50	\$175.00	\$ 8,750.00
Bulls	2	2	378.00	756.00
Heifers, more than 1 year ..	8	4	140.00	1,120.00
Heifers, less than 1 year ...	8	2	100.00	800.00
Total	68	58		\$11,426.00

SALES

Item	Head	Weight	Price	Value Per Head	Total Value
Cull cows	7	1,000	\$15.00	\$150.00	\$1,050.00
Heifer calves	14*	455	20.08	91.36	1,279.04
Steer calves	23	485	24.84	120.47	2,770.81
Total Receipts					\$5,099.85

INPUT ITEMS

Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	50	150	\$ —	\$ —
Hay	tons			55.5	13.59**	754.24
Silage	tons			166.5	3.40**	566.10
Minerals and salt	lbs.	30	50	1,500	.03	45.00
Vet. and med.	\$	2.00	58	\$ 116.00		116.00
Bull depreciation	\$	61.00	2	\$ 122.00		122.00
Hauling & marketing	cwt.			\$ 245.00	.75	183.75
Tax on livestock	\$100 assessed					
	eval.†	.70	57	\$ 39.90		39.90
Machinery	\$/cow	\$37.84	50	\$1,892.00		1,892.00
Fencing	\$/cow	2.40	50	\$ 120.00		120.00
Total of Specified Costs						\$3,888.99
Returns to Owned Factors						\$1,260.86
Returns Per Cow Above Specified Costs						\$ 25.22

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

be offset by the lower cost of production and harvesting silage. The fixed cost of owning both hay and silage equipment exceeds the fixed cost of hay machinery by about \$529 per year. However, a ton of hay equivalent can be produced and harvested for \$10.20 (\$3.40 x 3 tons) as corn silage; but as alfalfa-mixed hay the cost is \$13.59 per ton, or \$3.39 per ton more. Thus, when 450 or more tons of silage (150 ton hay-equiv-

TABLE 9.07

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration of Alfalfa-Mixed Hay; Assuming 80 Per Cent Calf Crop; Selling Feeder Calves Weighing 420 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units		Value Per Head	Total Value	
Brood cows	100	100		\$175.00	\$17,500.00	
Bulls	4	4		378.00	1,512.00	
Heifers, more than 1 year ..	16	8		140.00	2,240.00	
Heifers, less than 1 year ...	16	4		100.00	1,600.00	
Total	136	116			\$22,852.00	
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	14	1,000	\$15.00	\$150.00	\$2,100.00	
Heifer calves	24*	405	21.08	85.37	2,048.88	
Steer calves	40	430	25.84	111.11	4,444.40	
Total Receipts					\$8,593.28	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons		210		13.59**	2,853.90
Minerals and salt	lbs	30	100	3,000	.03**	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation ...	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		409		.75	306.75
Tax on livestock	\$100 assessed eval.†	.70	114			79.80
Machinery	\$/cow	17.66	100	\$1,766.00		1,766.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$5,812.45
Returns to Owned Factors						\$2,780.83
Returns Per Cow Above Specified Costs						\$ 27.81

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

alent) is utilized, the total cost is about as low with silage and hay as with hay alone. If silos are available, the larger the percentage of the forage requirement produced in the form of corn silage, the lower the total cost of producing forage for the 100-cow herd.

TABLE 9.08

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration of Alfalfa-Mixed Hay; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Weighing 420 Pounds, October 15

LIVESTOCK INVESTMENT				
Item	Head	Animal Units	Value Per Head	Total Value
Brood cows	100	100	\$175.00	\$17,500.00
Bulls	4	4	378.00	1,512.00
Heifers, more than 1 year ..	16	8	140.00	2,240.00
Heifers, less than 1 year ...	16	4	100.00	1,600.00
Total	136	116		\$22,852.00

SALES

Item	Head	Weight	Price	Value Per Head	Total Value
Cull cows	14	1,000	\$15.00	\$150.00	\$2,100.00
Heifer calves	28*	405	21.08	85.37	2,390.36
Steer calves	46	430	25.84	111.11	5,111.06
Total Receipts					\$9,601.42

INPUT ITEMS

Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons		210		13.59**	2,853.90
Minerals and salt	lbs	30	100	3,000	.03**	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation ...	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		452		.75	339.00
Tax on livestock	\$100 assessed					
	eval.†	.70	114			79.80
Machinery	\$/cow	17.66	100			1,766.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$5,844.70
Returns to Owned Factors						\$3,756.72
Returns Per Cow Above Specified Costs						\$ 37.57

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

TABLE 9.09

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration of Alfalfa-Mixed Hay; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 470 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units	Value Per Head	Total Value		
Brood cows	100	100	\$175.00	\$17,500.00		
Bulls	4	4	378.00	1,512.00		
Heifers, more than 1 year ..	16	8	140.00	2,240.00		
Heifers, less than 1 year ...	16	4	100.00	1,600.00		
Total	136	116		\$22,852.00		
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	14	1,000	\$15.00	\$150.00	\$ 2,100.00	
Heifer calves	28*	455	20.08	91.36	2,558.08	
Steer calves	46	485	24.84	120.47	5,541.62	
Total Receipts					\$10,199.70	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons		222		13.59**	3,016.98
Minerals and salt	lbs	30	100	3,000	.03**	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		490		.75	367.50
Tax on livestock	\$100 assessed					
	eval.†	.70	114			79.80
Machinery	\$/cow	17.66	100			1,766.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$6,036.28
Returns to Owned Factors						\$4,163.42
Returns Per Cow Above Specified Costs						\$ 41.63

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

TABLE 9.10

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration Alfalfa-Mixed Hay and Silage; Assuming 80 Per Cent Calf Crop; Selling Feeder Calves Weighing 420 Pounds, October 15

LIVESTOCK INVESTMENT				
Item	Head	Animal Units	Value Per Head	Total Value
Brood cows	100	100	\$175.00	\$17,500.00
Bulls	4	4	378.00	1,512.00
Heifers, more than 1 year ..	16	8	140.00	2,240.00
Heifers, less than 1 year ...	16	4	100.00	1,600.00
Total	136	116		\$22,852.00

SALES

Item	Head	Weight	Price	Value Per Head	Total Value
Cull cows	14	1,000	\$15.00	\$150.00	\$2,100.00
Heifer calves	24*	405	21.08	85.37	2,048.88
Steer calves	40	430	25.84	111.11	4,444.40
Total Receipts					\$8,593.28

INPUT ITEMS

Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons		105		13.59**	1,426.95
Silage	tons		315		3.40**	1,071.00
Minerals and salt	lbs	30	100	3,000	.03†	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		409		.75	306.75
Tax on livestock	\$100 assessed eval.†	.70	114			79.80
Machinery	\$/cow	22.95	100	\$2,295.00		2,295.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$5,985.50
Returns to Owned Factors						\$2,607.78
Returns Per Cow Above Specified Costs						\$ 26.08

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

TABLE 9.11

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration Alfalfa-Mixed Hay and Silage; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Weighing 420 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units		Value Per Head	Total Value	
Brood cows	100	100		\$175.00	\$17,500.00	
Bulls	4	4		378.00	1,512.00	
Heifers, more than 1 year ..	16	8		140.00	2,240.00	
Heifers, less than 1 year ...	16	4		100.00	1,600.00	
Total	136	116			\$22,852.00	
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	14	1,000	\$15.00	\$150.00	\$2,100.00	
Heifer calves	28*	405	21.08	85.37	2,390.36	
Steer calves	46	430	25.84	111.11	5,111.06	
Total Receipts					\$9,601.42	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons		105		13.59**	1,426.95
Silage	tons		315		3.40**	1,071.00
Minerals and salt	lbs	30	100	3,000	.03	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		452		.75	339.00
Tax on livestock	\$100 assessed					
	eval.†	.70	114			79.80
Machinery	\$/cow	22.95	100	\$ 22.95		2,295.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$6,017.75
Returns to Owned Factors						\$3,583.67
Returns Per Cow Above Specified Costs						\$ 35.84

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

TABLE 9.12

Estimated Production Requirements and Income for a Beef Herd of 100 Cows, Winter Ration of Alfalfa-Mixed Hay and Silage; Assuming 90 Per Cent Calf Crop; Selling Feeder Calves Averaging 470 Pounds, October 15

LIVESTOCK INVESTMENT						
Item	Head	Animal Units		Value Per Head	Total Value	
Brood cows	100	100		\$175.00	\$17,500.00	
Bulls	4	4		378.00	1,512.00	
Heifers, more than 1 year ..	16	8		140.00	2,240.00	
Heifers, less than 1 year ...	16	4		100.00	1,600.00	
Total	136	116			\$22,852.00	
SALES						
Item	Head	Weight	Price	Value Per Head	Total Value	
Cull cows	14	1,000	\$15.00	\$150.00	\$ 2,100.00	
Heifer calves	28*	455	20.08	91.36	2,558.08	
Steer calves	46	485	24.84	120.47	5,541.62	
Total Receipts					\$10,199.70	
INPUT ITEMS						
Item	Unit	Rate	Number	Total	Price	Total Cost
Pasture	acres	3	100	300	\$ —	\$ —
Hay	tons			111	13.59**	1,508.49
Silage	tons			333	3.40**	1,132.20
Minerals & salt	lbs	30	100	3,000	.03	90.00
Vet. and med.	\$	2.00	116	\$ 232.00		232.00
Bull depreciation	\$	61.00	4	\$ 244.00		244.00
Hauling & marketing	cwt.		490		.75	367.50
Tax on livestock	\$100 assessed eval.†	.70	114			79.80
Machinery	\$/cow	22.95	100	\$2,295.00		2,295.00
Fencing	\$/cow	2.40	100			240.00
Total of Specified Costs						\$6,188.99
Returns to Owned Factors						\$4,910.71
Returns Per Cow Above Specified Costs						\$ 40.11

*Assuming eight heifers kept for replacement.

**Includes variable costs of production only.

†Assessed evaluation equal to 50 per cent of actual value.

Summary and Conclusions

The costs of producing feeder calves and the return to owned factors of production—land, buildings, livestock investment, labor, and management—vary greatly depending upon the size of the herd and the effectiveness of management. The results of good management are reflected in the number, quality, and weight of calves going to market, and in the productivity of the cropland and the resulting cost per ton of producing forages.

Machinery costs are a critical factor in determining the profitability of a beef herd. The minimum investment in machinery to produce the forage for a beef herd dictates that the minimum number of cows in the herd be 50 or more to reduce the fixed costs per cow below expected returns.

Returns to owned factors of production from a 50-cow herd range from \$560 to \$1,600 (\$11.20 to \$32 per head) for the systems considered. Returns from comparable systems ranged from \$2,608 to \$4,163 from a 100-cow herd.

To obtain an average annual return of \$4,000 or greater to the factors assumed to be owned, a beef herd of approximately 100 cows, a calf crop of 90 per cent, an average 470-pound selling weight for calves and high crop yields are required. If the producer does not own the above specified factors of production, interest payments for borrowed capital will reduce the income available for family living.

BIBLIOGRAPHY

- Agricultural Engineers' Yearbook*, 1962, 1964. "Farm Machinery Costs and Use." pp. 230-235, American Society of Agricultural Engineers, St. Joseph, Michigan.
- Barr, A. L., et al. 1960. *Beef Cattle Systems and Range Improvement Alternatives: Estimated Production, Income and Costs*, Oklahoma State University Processed Series P-358. Oklahoma State University, Stillwater.
- Barr, A. L., et al. 1964. *Sheep Production—Costs and Returns in West Virginia*, W. Va. Univ. Agri. Exp. Sta. Bull. 495. West Virginia University, Morgantown.
- Field Workers' Blue Book, Livestock Program*, 1960-1965. "Summary of West Virginia Demonstrational Feeder Calf Sales." Cooperative Extension Service, West Virginia University, Morgantown.
- "Livestock and Poultry Inventory, January 1," U.S.D.A. SRS, Crop Reporting Board, Washington, D.C., 1962, 1963, 1964, 1965.
- West Virginia Agricultural Statistics*, 1964. West Virginia Department of Agriculture, Charleston, West Virginia, C. R. Bull., No. 6.