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Estimated annual costs, production, and income for selected livestock and crop enterprises, eastern West Virginia

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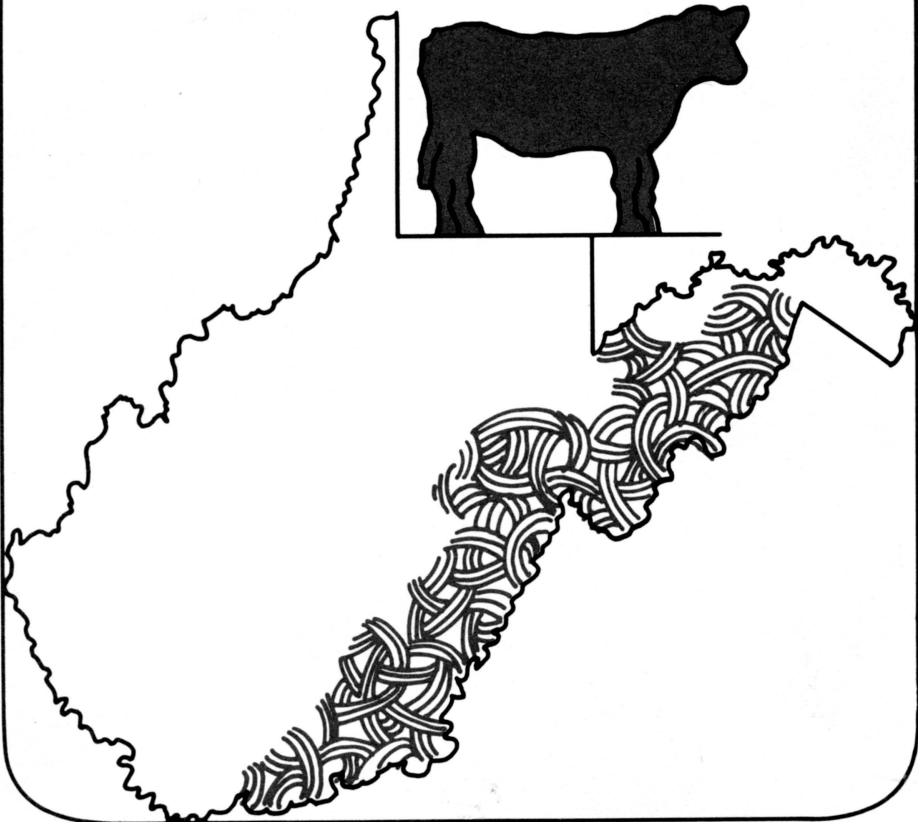
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**Estimated Annual Costs,
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Eastern West Virginia**

WEST VIRGINIA UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
Bulletin 594T June 1970



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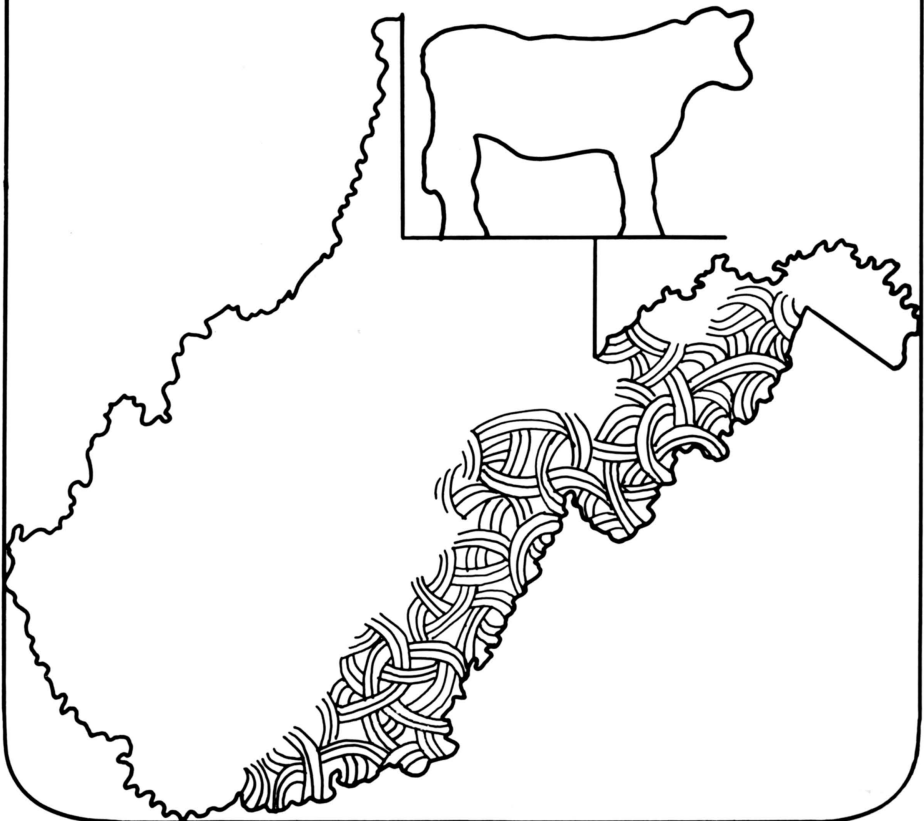
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Preface

TIMELY adjustments in farm size and organization are necessary if farmers are to meet the challenge of changing technical and economic conditions which are both internal and external to the American farm sector. Thus, farmers must continuously reevaluate their production systems and methods in order to maintain a viable and competitive operation. This publication contains information which can be helpful to those interested in evaluating alternative livestock and cropping systems.

The data presented herein were developed as a part of a research effort dealing with the economics of alternative livestock production system on West Virginia farms. At present, an economic analysis is being concluded, incorporating these alternative enterprises and utilizing knowledge of resources available on eastern West Virginia beef cattle farms.

The cooperation and aid of numerous individuals and agencies are acknowledged and deeply appreciated. Special thanks are due Drs. Gerald Jung, G. G. Pohlman, Clifford Porter, Carl Ingle, and Collins Veatch of the Division of Plant Science and Drs. G. C. Anderson, E. K. Inskeep, and Donald Horvath, and Mr. Joe Emch of the Division of Animal and Veterinary Sciences of the College of Agriculture and Forestry of West Virginia University who provided data on input requirements and production estimates.

Introduction

LAND suitable for intensive crop production is more limited and land adapted to pasture and forage production is more abundant in West Virginia than in neighboring states. Therefore, a livestock grazing system of farming has evolved in West Virginia. However, recent economic studies and trends in livestock numbers indicate that production adjustments by West Virginia farmers to changing economic and technical conditions are being made rather slowly. Management problems manifest themselves in a reduced number of farms, by a larger percentage of farmers working in off-farm employment, and by low farm incomes. Most West Virginia farmers have not adopted highly profitable systems of farming.

The data presented in this publication are not necessarily representative of any individual production situation; thus, the data may need to be adapted to individual circumstances. The input-output data presented were derived from experimental research results, farmer experiences as obtained from surveys, and informed and experienced specialists familiar with agricultural production in West Virginia. The livestock budgets were developed assuming that the farmer is presently engaged in and equipped with the resources for an extensive beef cow-calf and/or sheep farming program. Further, it was assumed that these farm resources could be adopted for utilization in dairy or swine enterprises.

Area of Application

The area of application includes eight eastern West Virginia counties which were classed into three separate areas on the basis of climate, elevation, topography, and land-use capability differentials. **Area I** consists of Hampshire, Hardy, Grant, and Pendleton counties; **Area II** Randolph and Pocohontas counties; and **Area III** Greenbrier and Monroe counties (see Figure 1).

Budgets were developed and adjusted to reflect physical conditions as they exist in each of the three areas. The crop and pasture budgets were developed individually for the specific soils most commonly found on a selected sample of farms in each of the three areas defined (a description of the major soils for

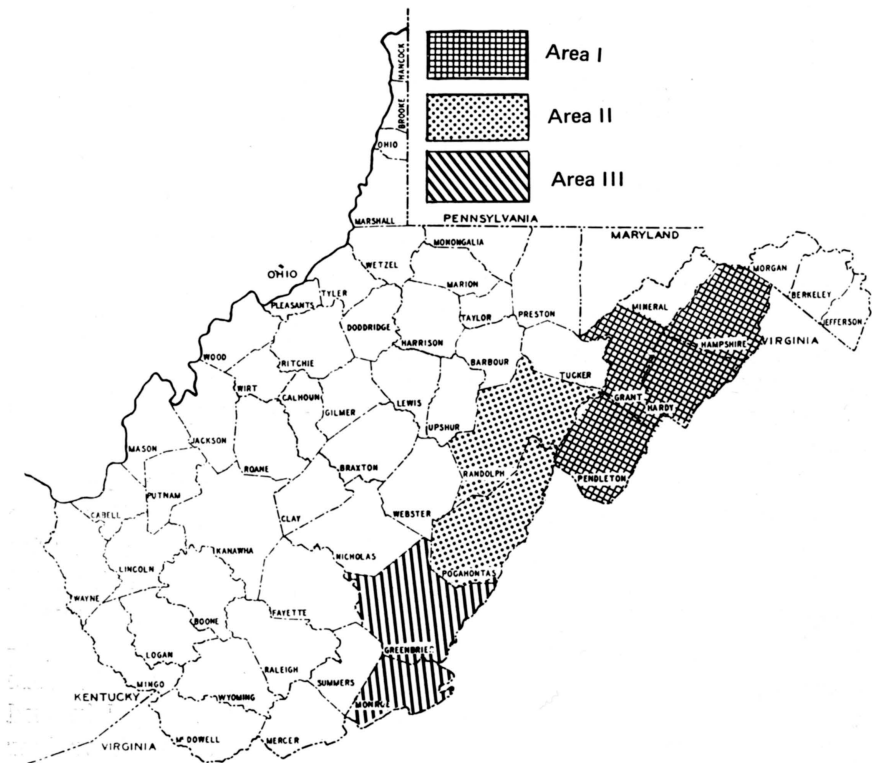


Figure 1. Location of the three study areas.

cropping is presented in Appendix Table 9). Consequently, the crop budgets and, more specifically, the production data have quite restricted use for the geographic areas defined. However, the cost estimates have application to much of West Virginia.

The livestock budgets were developed to be equally applicable in all three areas. In fact, the budgets can, with minor adjustments, be used for West Virginia in general.

The input-output cost, and income data presented were designed to reflect typical expectations for above average management, "normal" weather for the areas defined, and long-run average prices. Obviously, less efficient management, variations from normal weather, or price variations would materially alter the results, as would differences in soils from those specified.

Budgetary Factors Considered

PRICES

The livestock prices used were long-term average seasonal prices and can be found in Appendix Tables 1-6. Milk prices used were those which were received by farmers in the three areas in 1968. Only this one year was used since farm milk prices have continually increased in recent years.

Prices used for crops were based on an average of prices received by West Virginia farmers for the eight-year period, 1959-1966. This period was used since prices received by farmers vary with market conditions; these data are presented in Appendix Table 7.

Prices of production goods and services, also presented in Appendix Table 7, were based on 1969 market quotations. A description of the machinery assumed to be used in producing the budgeted crops and the associated variable operating expenses per hour are presented in Appendix Table 8.

LABOR REQUIREMENTS

The seasonal labor requirements presented in the individual budgets include only the direct productive labor requirements of the specific crop and/or livestock enterprise. Thus, the amounts shown do not include non-specific "overhead" labor associated with a farming operation.

The "months" included in the seasonal labor periods as specified in the budgets do not conform to the typical seasonal breakdown of a calendar year. Instead, the labor periods are as follows: winter, November 1—March 15; spring, March 16—June 30; summer, July 1—August 31; and fall, September 1—October 31.

CAPITAL

All crop and livestock budgets include the estimated operating expenses associated with the specific enterprise. Also, the livestock budgets include the investment capital required for the breeding livestock of a constant herd or flock size. In addition, the capital for feed bunks and similar equipment items were included in the livestock budgets. Since the budgets presented were developed for farms assumed to be presently engaged in extensive farm programs such as beef cow-calf or sheep production, or both, the

additional capital requirements for conversion to a dairy enterprise are reflected in the dairy budget. These additional requirements include building and equipping a milk room and milking parlor plus adapting present buildings to a dairy enterprise.

The capital investments in land, buildings, and machinery for the extensive systems were not included in the livestock budgets. These expenditures were assumed to be fixed costs for the farms studied.

PRODUCTION

In the beef cow-calf and sheep budgets, replacements were assumed to be retained from annual production to maintain the average herd or flock size and value. The sow-feeder pig alternative was budgeted assuming the purchase of replacement gilts, and replacement heifers were assumed purchased or raised in the dairy cow budgets. Male breeding animals or their services were assumed purchased in all cases. In addition, estimated receipts from cull and sterile breeding animals were included in the livestock budgets.

Pasture requirements for livestock were determined using animal unit standards (see Appendix Table 10 for definition) and were presented for a five-month grazing period. Pasture was not assumed to be a limiting resource after September in that cropland is usually pastured in the fall months in West Virginia.

RETURNS

Returns to land, labor, capital management, and risk are the amount by which gross cash receipts exceed cash expenses. By placing an appropriate cost on any or all of these stated items, one can more closely approach a "net" revenue or profit return.

Alternative Livestock Enterprises

BEEF CATTLE ALTERNATIVES

In Tables 1.01 and 1.02, budgets are presented for a beef cow-calf enterprise of one "bull unit" size or twenty-five brood cows, the herd replacements, and a bull. The herd was assumed to produce, on the average, "good" grade feeder animals to be marketed in mid-October. Pasture was assumed as the feed source for a seven-month period. Budgets for two alternative winter rations

are presented; the ration of Table 1.01 consists of grass hay and grains and the ration of Table 1.02 is composed of corn silage and clover-grass hay.

A second beef cattle alternative consisted of the wintering of a 470-pound feeder steer (Tables 2.01-2.03). It was assumed that the steer would be obtained in late October either by retention from the beef cow-calf operation or by purchase. The steer was assumed to be fed a winter ration calculated to permit a gain of one pound per day for a 185-day period to produce a 650-pound steer grading "good" in early May. Three alternative winter rations were budgeted: corn silage and soybean oil meal (Table 2.01); clover-grass hay (Table 2.02); and clover-grass hay and corn silage (Table 2.03). It was assumed that the steer could be sold in May or retained for additional gain from summer grazing.

A yearling steer for the summer grazing enterprise (Table 3.01) could also be purchased. The yearling steer was assumed to be pastured for 150-day period, to have a daily gain of 1.5 pounds, and to be sold in early October at a weight of 875 pounds and grading "good".

SHEEP ALTERNATIVES

A sheep alternative, Table 4.01 and 4.02, was budgeted for one "ram unit" consisting of thirty-three ewes, the flock replacements, and a ram. The flock was assumed to produce a 159 percent lamb crop with the lambs being born approximately March 1 and marketed August 1 at an average weight of ninety-seven pounds.

Pasture was assumed the feed source for the seven-month period, and two ration alternatives were included for the breeding flock. One ration consists of clover-grass hay and grain (Table 4.01), and a second includes corn silage and clover-grass hay (Table 4.02). In both ration alternatives, grain feeding of lambs was assumed.

DAIRY ALTERNATIVES

The dairy cow alternatives were budgeted for a loose housing system (Tables 5.01-5.05). Since resources not available on the farms considered would need to be acquired, the annual costs of constructing and equipping a milk room and milking parlor to accommodate a 50-cow dairy herd were included in the budgets. In addition, the annual costs of adapting present livestock

buildings, providing a bulk tank, and acquiring other required equipment were budgeted on the per cow basis. To provide cost estimates for herd expansion above the 50-cow capacity, the annual cost per cow for additions to the bulk tank and for other required adaptations was included. The initial total capital outlay for acquiring or adapting these facilities also was presented with the inclusion of a block of "fixed" labor required for care and maintenance of the dairy herd.

Five ration alternatives ranging from one requiring no grain to one requiring one of grain per 4.75 pounds of milk were included for the dairy alternatives. Each of the five rations was assumed to yield a different milk production level, ranging from 9,400 to 13,000 pounds.

A separate budget was developed to provide for the raising of dairy cow replacements (Table 6.01). It was assumed that the replacement heifers would utilize a ration of commercially mixed concentrates, clover hay, and corn silage.

SWINE ALTERNATIVES

The sow-feeder pig budgets were developed assuming that each sow would produce two litters of eight, 50-pound feeder pigs or a total of sixteen marketable feeder pigs per year (Tables 7.01-7.02). The cost of the boar was pro-rated among fifteen sows. In addition, housing for farrowing and nursing was based on a fifteen-sow herd. Two alternative rations were budgeted for the sows and boar. One assumed the use of home grown grains (Table 7.01) while the other assumed the use of commercially prepared and purchased feeds (Table 7.02). The pigs produced could either be marketed as feeder pigs or retained for production of market hogs.

The market hog enterprise budgets (Tables 8.01-8.02) assumed that 50-pound pigs would be fed to 220-pounds grading U.S. No. 1-2, in a 105-day period. It was assumed that the farmer would have the option of producing a hog for market either in February, July, or both. Only one ration was budgeted for the market hogs. The ration consisted of corn mixed with a 38.0 per cent commercial supplement fed with a small quantity of clover hay for forage.

Crop Alternatives

Budgets were prepared for grain and forage alternatives for specific soils found on many of the farms studied in each of the

three areas previously defined (See Figure 1 for the areas defined and Appendix Table 10 for characteristics of the soils).

The annual production data used in the budgets were based on yields obtained from field trials in which seeding, fertilizer, and liming rates are those recommended to farmers for the specific soils by agronomists of West Virginia University. The yield data were converted to "farmer yields" (bushels, tons, etc.) However, the yields, as presented, were not reduced to account for losses associated with harvest, storage, and feeding of the crops.

Tractor, machinery, and labor requirements were adjusted for mainly slope differences. The requirements of the inputs for producing a given crop were estimated to be ten percent greater on Class III land and twenty-five percent greater on Class IV land than on Classes I and II land.

The grain crops budgeted were corn, oats, wheat, and barley (Table 9.01-9.10). Budgets were prepared for harvesting small grains either as grain or hay. The small grains were assumed to serve only as a supplementary crop in rotation when seeding for hay establishment; the yields for small grains were reduced to reflect this fact. In addition, the seeding costs for clover establishment were included in the small grain budgets. Further, orchard grass could be seeded along with clover for \$0.20 additional cost per acre in the small grain budgets.

Forage producing alternatives budgeted were corn silage, clover and orchard grass (Table 9.01-9.10 for corn silage and Table 10.01-10.10 for the hays). Clover, in one case, was assumed to be grown alone as a hay crop with a two-year life-stand. Clover budgets for each production year after establishment are presented. Clover, in a second instance, was assumed capable of being in rotation with orchard grass hay.

Orchard grass is capable of from one to ten years life-stand when fertilized as assumed in the budgets; it may be in rotation at the indicated annual yield for any length of time within the life-stand capability.

Pasture Alternatives

Alternative pasture budgets are presented for annually maintaining and improving pastures at three levels (Tables 11.01-11.03). The budgets reflect the lime and fertilizer requirements for common pasture soils for the areas previously defined. Also, the alternative pasture budgets distinguish between upland and

bottomland capabilities of pastures. The upland pasture budgets have tractor, machinery, and labor inputs 25 per cent greater than bottomland pasture requirements due to increased slope.

The budgets presented include the animal unit carrying capacity of the different pasture treatments for five grazing months divided into two pasturing periods, May-June and July-August-September. Typically, the West Virginia farmer underutilizes pasture during the first period and overutilizes it during the second period. This is done by pasturing his acreage at a constant stocking rate throughout the pasturing period. However, 50 per cent of the unused May-June pasture was estimated to be transferable to the July-September period.

The three levels of pasture treatment for which budgets are presented includes: one which requires only fencing and, otherwise remains in its natural state; a second which additionally reflects liming every ten years, topdressing with phosphorus and potassium every four years, fertilizing with nitrogen every five years, and clipping weeds annually; and a third which, in addition to the treatments of the second, also includes reseeding of pastures every forty years. The farmer can estimate his costs for pasture improvement, when cooperating under ACP, by subtracting the ACP payments which currently cover 80 per cent of the seed costs and 50 per cent of the lime and fertilizer costs.

Sudangrass pasture budgets are presented for each of the soils specified in the areas defined (Table 11.04). The production estimates were made assuming the use of the new, commercial, hybrid Piper varieties and that an animal unit requires 450 pounds of T.D.N. per month (supplemental pasture feeding of forages may be estimated using this data). Also, estimated losses of 20 per cent due to livestock trampling, unpalatable stalks, and other losses were included. As in the case of crops, inputs were increased for land classes with increased slopes.

TABLE 1.01

Estimated Annual Costs and Returns for a One Bull-Unit Beef Cow-Calf Enterprise, Selling "Good" Grade Feeder Calves in Mid-October and Using a Ration of Clover-Grass Hay and Corn Silage^a.

Item	Unit	Amount	Dollars or Rate	Value ¹
Receipts:				
Steer calves(11.25 head) ^b	Cwt.	52.88	26 86	\$1420.36
Heifer calves (7.25 head) ^b	Cwt.	32.63	22.36	729 61
Cull cows (3.25 head) ^c	Cwt.	32.50	15.00	487.50
Cull replacements (0.75 head) ^c	Cwt.	4.88	15.00	73.20
Cull bull (0.25 head) ^c	Cwt.	4.00	16.00	64.00

	Total			\$2774.67
Expenses:				
Minerals and salt ^{e,d}	Cwt.	7.63	3.30	\$ 25.18
Veterinary and medicine ^e	Cows	25.00	2.00	50.00
Hauling and marketing ^e	Cwt.	124.64	0.75	93.48
Electricity ^{d,e}	Kwh.	2500.00	0.02	50.00
Livestock insurance ^d	\$100	53.00	0.65	34.45
Livestock tax ^f	\$100	40.74	0.50	20.37
Death loss ^g	\$	3750.00	0.02	75.00
Equipment ^g	Cows	25.00	1.60	40.00
Equipment repair ^e	\$	400.00	0.01	4.00
Building repair ^e	\$	1250.00	0.01	12.50
Machine operation ^e	Cows	25.00	1.25	31.25
Corn silage ^g	Tons	61.90	—	—
Clover-grass hay ^g	Tons	9.90	—	—
Winter labor ^e	Hours	217.50	—	—

TABLE 1.01 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Spring labor ^a	Hours	97.50	—	—
Summer labor ^a	Hours	22.50	—	—
Fall Labor ^a	Hours	37.50	—	—
Building space ^a	Sq. ft.	12.50	—	—
May-June pasture ^b	A. U.	33.70	—	—
July-September pasture ^b	A. U.	36.50	—	—

	Total			\$436.23
Livestock investment per production period:^c				
Brood cows	Head	—	175.00	\$4232.81
Bred heifer replacements	Head	—	200.00	487.50
Weaned replacements	Cwt.	—	22.36	201.24
Bull	Head	1.00	378.00	378.00

	Total			5299.55

^aA bull-unit was assumed equal to 1.0 herd bull, 25.0 brood cows, 3.25 yearling heifers (12-25 months), 4.0 weaned heifers (8-12 months), and 22.5 unweaned calves. Several basic assumptions were made: (1) the calf crop was 90 per cent; (2) calves were born approximately 15 January; (3) steers averaged 470 pounds and heifers, 450 pounds, at weaning; (4) heifers were bred at eighteen months of age and were to remain in the herd eight production periods or eight years; and (5) the herd bull was purchased at breeding age for \$500 and remained in the herd four years.

^bTo adjust for price differences associated with the larger assumed weights compared to the average weights as appearing in Appendix Table 1, p. 81, (steers, 437 pounds, and heifers, 410 pounds), linear regression coefficients of $-\$1.07$ cwt. for steers and $-\$0.12$ for heifers were used to adjust prices downward, as taken from Lynn Spiker, "Factors Influencing Price of Feeder Calves in West Virginia," (unpublished Master's thesis, College of Agriculture and Forestry, West Virginia University, 1967), p. 24.

^cAlfred L. Barr, George E. Toben, and Charles C. Wilson, **Resources, Production, and Income on Eastern West Virginia Beef Cattle Farms**, West Virginia University Agricultural Experiment Station Bulletin 546, (Morgantown: West Virginia University, 1967), pp. 33, 35, and 39. Death loss is expressed as a percentage of the cow's salvage value.

^dSee Appendix Table 7, p. 85 for cost data used. Insurance is based on average breeding animal value.

^e**Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), pp. 77 and 71. Equipment included feeder bunks, handling equipment, etc., for livestock, and the cost, as

appearing, is the new value depreciated by the straight line method for ten years. Repair costs for buildings and equipment are expressed as a percentage of original value.

^fSee Appendix Table 11, p. 92 for tax data. The tax rate in the study areas is based on 60 per cent of appraised value of assets held as of July 1. In this case, calves were assumed to be valued at \$75.00 per head as of July 1.

^gFrank B. Morrison, **Feeds and Feeding**, (Ithaca: The Morrison Publishing Co., 1956), p. 1120.

^hSee Appendix Table 10, p. 91 for the animal unit values used in determining pasture requirements.

ⁱThe breeding herd was assumed to maintain a constant value per production period. Valuations methods were as follows:

(1) Cows were assumed to have a maximum appreciated value of \$200 and a salvage value of \$150 per head; thus an average value of \$175 per head was used. The herd would consist of 25.0 cows for a nine-month period and 21.75 cows for a three-month period after culls were sold.

(2) Bred heifers were assumed to appreciate to \$200 at first calving. There would be 3.25 bred heifers in the herd for a nine-month period from time of breeding to calving.

(3) Weaned heifers were valued at the feeder calf market price. There would be 4.0 weaned heifers in the herd for a six-month period from the time of weaning to breeding.

(4) An average of \$500 purchasing value and \$256 salvage value was assumed for the herd bull.

^jItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 1.02

Estimated Annual Costs and Returns for a One Bull-Unit Beef Cow-Calf Enterprise, Selling "Good" Grade Feeder Calves in Mid-October and Using a Ration of Grass Hay and Corn-and-Cob Meal Supplemented with Soybean Oil Meal^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Steer calves (11.25 head)	Cwt.	52.88	26.86	\$1420.36
Heifer calves (7.25 head)	Cwt.	32.63	22.36	729.61
Cull cows (3.25 head)	Cwt.	32.50	15.00	487.50
Cull replacements (0.75 head)	Cwt.	4.88	15.00	73.20
Cull bull (0.25 head)	Cwt.	4.00	16.00	64.00

	Total			\$2774.67
Expenses:				
Minerals and salt	Cwt.	7.63	3.30	\$ 25.18
Veterinary and medicine	Cows	25.00	2.00	50.00
Hauling and marketing	Cwt.	124.64	0.75	93.48
Electricity	Kwh.	2500.00	0.02	50.00
Livestock insurance	\$100	53.00	0.65	34.45
Livestock tax	\$100	40.74	0.50	20.37
Death loss	\$	3750.00	0.02	75.00
Equipment	Cows	25.00	1.60	40.00
Equipment repair	\$	400.00	0.01	4.00
Building repair	\$	1250.00	0.01	12.50
Machine operation	Cows	25.00	1.25	31.25
Grass hay ^b	Tons	50.00	—	—
Corn-and-cob meal ^b	Bushels	44.65	—	—

Item	Unit	Amount	Dollars or Rate	Value
Soybean oil meal ^b	Cwt.	3.25	5.01	16.28
Feed grinding	Cwt.	34.50	0.18	6.21
Winter labor	Hours	217.50	—	—
Spring labor	Hours	97.50	—	—
Summer labor	Hours	22.50	—	—
Fall labor	Hours	37.50	—	—
Building space	Sq. ft.	1250.00	—	—
May-June pasture	A.U.	33.70	—	—
July-September pasture	A.U.	36.50	—	—

Total				\$ 458.72
Livestock investment per production period:				
Brood cows	Head	—	175.00	\$4232.81
Bred heifer replacements	Head	—	200.00	487.50
Weaned replacements (4.0 head)	Cwt.	—	22.36	201.24
Bull	Head	1.00	378.00	378.00

Total				\$5299.55

^aSee all footnotes of Table 1.01, except footnote g, for assumptions and documentation.

^bSee footnote c of Table 1.01 for the ration documentation.

TABLE 2.01

Estimated Annual Costs and Returns for Wintering of One Feeder Steer for 185 Days, Feeding a Ration of Corn Silage and Soybean Oil Meal to Permit a One Pound Gain Per Day^{a, b}

Item	Unit	Amount	Dollars or Rate	Value ¹
Receipts:				
Steer ^c	Cwt.	6.50	27.90	\$ 181.35
Total				\$ 181.35
Expenses:				
Steer calf ^d	Cwt.	4.70	26.86	\$ 126.24
Minerals and salt ^{e, f}	Cwt.	0.15	3.30	0.50
Veterinary and medicine ^{e, f}	Head	1.00	1.50	1.50
Hauling and marketing ^g	Cwt.	6.50	0.75	4.88
Electricity ^{h, f}	Kwh.	27.00	0.02	0.54
Livestock insurance ^f	\$100	1.54	0.65	1.00
Death loss ¹	\$	154.00	0.01	1.54
Equipment ¹	Head	1.00	9.60	9.60
Equipment repair ¹	\$	96.00	0.01	0.96
Building repair ¹	\$	30.00	0.01	0.30
Machine operation ¹	Head	1.00	0.75	0.75
Corn silage ^b	Tons	2.78	—	—
Soybean oil meal ^{b, f}	Cwt.	1.85	5.01	9.27
Fall labor ¹	Hours	0.60	—	—
Winter labor ¹	Hours	7.10	—	—
Spring labor ¹	Hours	2.40	—	—
Building space ¹	Sq. ft.	30.00	—	—
Total				\$ 157.08

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^aSteer calves were assumed retained from the cow-calf enterprise or purchased at 470 pounds on October 24 and sold on approximately May 1.

^bGain and feed data were based on Alfred L. Barr, **Beef Management Systems of West Virginia University Animal Industry and Agronomy Field Day**, ed. Department of Animal Science (Morgantown: West Virginia University, 1968) p. 3.

^cSee Appendix Table 2, p. 82 for spring steer prices used.

^dSee Appendix Table 1, p. 81 for fall feeder calf prices used.

^eBased on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), Appendix Table 28, p. 142.

^fSee Appendix Table 8, p. 88 for cost data used. Insurance is based on average animal value.

^gAlfred L. Barr, George E. Toben, and Charles C. Wilson, **Resources, Production, and Income on Eastern West Virginia**

Beef Cattle Farms, West Virginia University Agricultural Experiment Station Bulletin 546 (Morgantown: West Virginia University, 1967), Table 31, p. 43.

^h**Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A. E. & R.S. 51, (University Park: The Pennsylvania State University, 1965), p. 75.

ⁱSeamus Sheehy, "Selection of Representative Benchmark Farms in Synthetic Supply Estimation," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1964), pp. 211-212. Death loss was figured as a per cent of average animal value. Equipment cost, as appearing, is the new value depreciated by the straight-line method for ten years. Repair costs for buildings and equipment are expressed as a percentage of original value.

^jItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 2.02

Estimated Annual Costs and Returns for Wintering of One Feeder Steer for 185 Days, Feeding a Ration of Clover-Grass Hay to Permit a One Pound Gain Per Day^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Steer	Cwt.	6.50	27.90	\$ 181.35
Total				\$ 181.35
Expenses:				
Steer calf	Cwt.	4.70	26.86	\$ 126.24
Minerals and salt	Cwt.	0.15	3.30	0.50
Veterinary and medicine	Head	1.00	1.50	1.50
Hauling and marketing	Cwt.	6.50	0.75	4.88
Electricity	Kwh.	27.00	0.02	0.54
Livestock insurance	\$100	1.54	0.65	1.00
Death loss	\$	154.00	0.01	1.54
Equipment	Head	1.00	9.60	9.60
Equipment repair	\$	96.00	0.01	0.96
Building repair	\$	30.00	0.01	0.30
Machine operation	Head	1.00	0.75	0.75
Clover-grass hay ^b	Tons	1.39	—	—
Fall labor	Hours	0.60	—	—
Winter labor	Hours	7.10	—	—
Spring labor	Hours	2.40	—	—
Building space	Sq. ft.	30.00	—	—
Total				\$147.81

^aSee Table 2.01 for assumptions and documentation.

^bFrank B. Morrison, **Feeds and Feeding** (Ithaca: The Morrison Publishing Co., 1956), p. 566.

TABLE 2.03
Estimated Annual Costs and Returns for Wintering of One Feeder Steer for 185 Days, Feeding a Ration of Corn Silage and Clover-Grass Hay to Permit a One Pound Gain Per Day^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Steer	Cwt.	6.50	27.90	\$ 181.35
Total				\$ 181.35
Expenses:				
Steer calf	Cwt	4.70	26.86	\$ 126.24
Mineral and salt	Cwt.	0.15	3.30	0.50
Veterinary and medicine	Head	1.00	1.50	1.50
Hauling and marketing	Cwt.	6.50	0.75	4.88
Electricity	Kwh.	27.00	0.02	0.54
Livestock insurance	\$100	1.54	0.65	1.00
Death loss	\$	154.00	0.01	1.54
Equipment	Head	1.00	9.60	9.60
Equipment repair	\$	96.00	0.01	0.96
Building repair	\$	30.00	0.01	0.30
Machine operation	Head	1.00	0.75	0.75
Corn silage ^b	Tons	2.31	—	—
Clover-grass hay ^b	Tons	0.37	—	—
Fall labor	Hours	0.60	—	—
Winter labor	Hours	7.10	—	—
Spring labor	Hours	2.40	—	—
Building space	Sq. ft.	30.00	—	—
Total				\$ 147.81

^aSee Table 2.01 for assumptions and documentation.

^bFrank B. Morrison, **Feeds and Feeding** (Ithaca: The Morrison Publishing Co., 1956), p. 566.

TABLE 3.01

Estimated Annual Costs and Returns for Pasturing One Yearling Steer for 150 Days at a Gain of 1.5 Pounds Per Day^a

Item	Unit	Amount	Dollars or Rate	Value ^a
Receipts:				
Steer ^b	Cwt.	8.75	22.55	\$ 197.31

Total				\$ 197.31
Expenses:				
Yearling steer ^c	Cwt.	6.50	27.90	\$ 181.35
Minerals and salt ^{d,e}	Cwt.	0.15	3.30	0.50
Veterinary and medicine ^d	Head	1.00	1.00	1.00
Spray material ^f	Head	1.00	0.50	0.50
Hauling and marketing ^g	Cwt.	8.75	0.75	6.56
Livestock insurance ^o	\$100	1.89	0.65	1.23
Livestock tax ^h	\$100	1.14	0.50	0.57
Death loss ⁱ	\$	181.35	0.01	1.81
Spring labor ^f	Hours	0.60	—	—
Summer labor ^f	Hours	0.60	—	—
Fall labor ^f	Hours	0.30	—	—
May-June pasture ^j	A.U.	0.70	—	—
July-September pasture ^j	A.U.	0.70	—	—

Total				\$ 193.52

"Good" grade yearling steers fed the previous winter for one pound gain per day were retained or purchased on May 1 and sold October 1, again grading "good."

^bSee Appendix Table 2, p. 82 for spring steer prices.

^cSee Appendix Table 2, p. 82 for stocker steer prices.

^dBased on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), Appendix Table 29, p. 144.

^eSee Appendix Table 7, p. 85 for cost data used. Insurance is based on average animal value.

^fRalph G. Kline, **Economics of Adjustments for Small Flue-Cured Tobacco Farms: Southside, Virginia**, Virginia Polytechnic Institute, Technical Bulletin 174 (Blacksburg: Department of Agricultural Economics, 1964), Appendix A, Table 19, p. 108.

^gAlfred L. Barr, George E. Toben, and Charles C. Wilson, **Resources, Production, and Income on Eastern West Virginia Beef Cattle Farms**, West Virginia University Agricultural Experiment Station Bulletin 546, (Morgantown: West Virginia University, 1967), Table 31, p. 43.

^hSee Appendix Table 11, p. 92 for tax data used. The tax rate in the study area is based on 60 per cent of appraised value of assets held as of July 1.

ⁱSeamus Sheehy, "Selection of Representative Benchmark Farms in Synthetic Supply Estimation," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1964), pp. 211-212. Death loss is expressed as a percentage of original animal value.

^jSee Appendix Table 10, p. 91 for animal units used.

^kItems for which no specified value is indicated may be raised, owned, rented or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 4.01

Estimated Annual Costs and Returns for a One Ram-Unit Sheep Enterprise, Feeding a Grain Ration to All Animals and Wintering with Clover-Grass Hay^a

Item	Unit	Amount	Dollars or Rate	Value ¹
Receipts:				
Lambs (46.6 head) ^{b,c}	Cwt.	45.20	22.30	\$1007.96
Cull ewes and replacements ^d	Head	5.90	7.00	41.30
Cull ram ^d	Head	0.33	15.00	5.00
Wool ^{b,c}	Cwt.	2.45	56.80	139.16
Wool incentive ^e	Cwt.	2.45	20.40	49.98
Lamb incentive ^e	Cwt.	45.20	0.69	31.19
				\$1274.59
	Total			
Expenses:				
Pheno-mineral salt ^{d,f}	Cwt.	2.04	12.20	\$ 24.89
Adult medication ^{e,f}	Head	34.00	0.46	15.64
Lamb medication ^{e,f}	Head	52.50	0.08	4.20
Hauling and marketing ^d	Cwt.	54.55	0.60	32.73
Electricity ^{g,t}	Kwh.	660.00	0.02	13.20
Livestock insurance ^t	\$100	6.99	0.65	4.54
Livestock tax ^h	\$100	10.23	0.50	5.12
Death loss ¹	\$	231.00	0.06	13.86
Equipment ¹	Ewe	33.00	0.30	9.90
Equipment repair ¹	\$	99.00	0.01	0.99
Building repair ¹	\$	660.00	0.01	6.60
Machine operation ¹	Ewe	33.00	0.21	6.93
Shearing ^d	Head	34.00	0.60	20.40

Item	Unit	Amount	Dollars or Rate	Value
Clover-grass hay ^e	Tons	6.14	—	—
Corn ^e	Bushels	19.20	—	—
Oats ^e	Bushels	22.38	—	—
Wheat brans ^{e, f}	Cwt.	3.61	3.49	12.60
Soybean oil meal (44%) ^{e, f}	Cwt.	1.81	5.01	9.07
Corn shelling ^g	Cwt.	10.82	0.07	0.76
Feed grinding ^g	Cwt.	23.45	0.18	4.22
Winter labor ^g	Hours	59.40	—	—
Spring labor ^g	Hours	49.50	—	—
Summer labor ^g	Hours	9.90	—	—
Fall labor ^g	Hours	23.10	—	—
Building space ^g	Sq. ft.	660.00	—	—
May-June pasture ^j	A.U.	7.30	—	—
July-September pasture ^j	A.U.	7.30	—	—

	Total			\$ 185.65
Livestock investment per production period^k				
Ewes	Head	—	18.50	\$ 551.11
Ewe-lamb replacements	Head	—	30.00	103.25
Ram	Head	1.00	45.00	45.00

	Total			\$ 699.36

(See next page for footnotes to Table 4.01)

(Footnotes for Table 4.01)

*A ram-unit was assumed equal to 1.0 ram, 33.0 ewes, 5.9 ewe-lamb replacements (weaned to 12.0 months), and 52.5 unweaned lambs. These animal numbers are also assumed equal to 33.0 ewe replacement units. Further, it is assumed (see Appendix Table 3, p. 83 for particular data):

- 1) Management level was in the highest per cent in the state by income per ewe;
- 2) Ewes would weigh 150.0 pounds, have six productive years in the flock, and would first lamb as yearlings;
- 3) Lambs were born March 1 and marketed August 1 at weight of 97.0 pounds, on the average;
- 4) The flock was assumed to have 159% lamb crop (weaned and marketable lambs), and lambs would grade 92.0% blue, 7.0% red, and 1.0% in lower grades;
- 5) The ram would have a three-year flock life after being purchased for \$75 and would be sold for \$15, and cull ewes would be sold when ewe-lambs were weaned for replacements;
- 6) A production period was assumed to entail a one-year period, from lambing to lambing.

^bSee Appendix Table 4, p. 84 for particular data.

^cSee Appendix Table 5, p. 84 for particular data.

^dAlfred L. Barr, B. W. Wamsley, Jr., and Mary C. Templeton, **Sheep Production, — Costs and Returns in West Virginia**, West Virginia University Agricultural Experiment Station Bulletin 495 (Morgantown: West Virginia University, 1966), pp. 15-17. A 6:4:2:1 ration of corn, oats, bran, and soybean oil meal, respectively, was assumed used for all animals in Ration 1 and only for lambs in Ration 2. A 7:7:1 mineral mixture of steam-bonemeal, salt, and phenothiazine, respectively, was used.

^eAlfred L. Barr, et al., **Biologic and Economic Aspects of Spring and Fall Breeding of Sheep**, West Virginia University Agricultural Experiment Station Bulletin 562 (Morgantown: West Virginia University, 1968), p. 9. Three doses of thiaben-

dazole at \$0.154 per dose, and one dose at \$0.077 per lamb were used. Feed consumed was 53.4 pounds per ewe and 10.1 pounds per lamb in Ration 1; adults consumed, in addition, 361.0 pounds of hay.

^fSee Appendix Table 7, p. 85 for cost data used. Insurance is based on average breeding animal value.

^g**Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), p. 77.

^hSee Appendix Table 11 p. 92 for tax data. The tax rate in the study areas is based on 60 per cent of the appraised value of assets held as of July 1. Lambs were valued at \$20 per head.

ⁱPaul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), Table 30, p. 146. Death loss is expressed as a percentage of the ewes' salvage value.

^jSee Appendix Table 10, p. 91 for animal units used.

^kThe following methods were used for evaluating livestock:

- 1) Ewes were valued at an average of maximum value of \$30 and salvage value of \$7. Thus, a value of \$18.50 per head was used for ewes. The flock consisted of 33.0 ewes for five months and 27.5 ewes for seven months after culls were sold.

- 2) The flock consisted of 5.9 lamb replacements for seven months from weaning to first lambing. The replacements were valued at a maximum value of \$30.

- 3) The ram was valued at an average of the purchase price, \$75, and the sale value, \$15, or \$45.

^lItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 4.02

Estimated Annual Costs and Returns for a One Ram-Unit Sheep Enterprise, Feeding a Grain Ration to Lambs, Only, and Wintering with Corn Silage and Clover-Grass Hay^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Lambs	Cwt.	45.20	22.30	\$1007.96
Cull ewes and replacements	Head	5.90	7.00	41.30
Cull ram	Head	0.33	15.00	5.00
Wool	Cwt.	2.45	56.80	139.16
Wool incentive	Cwt.	2.45	20.40	49.98
Lamb incentive	Cwt.	45.20	0.69	31.19

	Total			\$1274.59
Expenses:				
Pheno-mineral salt	Cwt.	2.04	12.20	\$ 24.89
Adult medication	Head	34.00	0.46	15.64
Lamb medication	Head	52.50	0.08	4.20
Hauling and marketing	Cwt.	54.55	0.60	32.73
Electricity	Kwh.	660.00	0.02	13.20
Livestock insurance	\$100	6.99	0.65	4.54
Livestock tax	\$100	10.23	0.50	5.12
Death loss	\$	231.00	0.06	13.86
Equipment	Ewe	33.00	0.30	9.90
Equipment repair	\$	99.00	0.01	0.99
Building repair	\$	660.00	0.01	6.60
Machine operation	Ewe	33.00	0.21	6.93
Shearing	Head	34.00	0.60	20.40

TABLE 4.02 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Corn silage ^b	Tons	8.42	—	—
Clover-grass hay ^b	Tons	8.42	—	—
Corn	Bushels	4.35	—	—
Oats	Bushels	4.22	—	—
Wheat bran	Cwt.	0.82	3.49	2.86
Soybean oil meal (44%)	Cwt.	0.41	5.01	2.05
Corn shelling	Cwt.	2.44	0.07	0.17
Feed grinding	Cwt.	5.30	0.18	0.95
Winter labor	Hours	59.40	—	—
Spring labor	Hours	49.50	—	—
Summer labor	Hours	9.90	—	—
Fall labor	Hours	23.10	—	—
Building space	Sq. ft.	660.00	—	—
May-June pasture	A.U.	7.30	—	—
July-September pasture	A.U.	7.30	—	—
				\$ 165.03
Livestock investment per production period:				
Ewes	Head	—	18.50	\$ 551.11
Ewe-lamb replacements	Head	—	30.00	103.25
Ram	Head	1.00	45.00	45.00
				\$ 699.36

^aSee Table 4.01 for assumptions and documentation.

^bFrank B. Morrison, **Feeds and Feeding** (Ithaca: The Morrison Publishing Co., 1956), p. 1121.

TABLE 5.01

Estimated Annual Costs and Returns for a Dairy Cow Enterprise, Utilizing a Loose-Housing System and Feeding an All-Forage ration (No Grain) of Corn Silage and Clover Hay for 9,400 Pounds Milk Production^a

Item	Unit	Amount	Dollars or Rate	Value ¹
Receipts				
Milk ^b	Cwt.	94.00	—	—
Cull cow (0.25 head) ^c	Cwt.	3.00	14.00	\$ 42.00
Bob calf ^c	Cwt.	0.50	20.00	10.00
Total				\$ 52.00
Expenses:				
Minerals and salt ^{d,e}	Cwt.	0.31	3.30	\$ 1.02
Veterinary and medicine ^c	Head	1.00	4.92	4.92
Hauling and Marketing ^e	Cwt.	3.50	0.75	2.63
Electricity ^{c,d}	Kwh.	188.00	0.02	3.76
Breeding fee ^c	Head	1.00	6.00	6.00
Milk testing ^c	Head	1.00	6.00	6.00
Dairy supplies ^c	Head	1.00	16.00	16.00
Livestock insurance ^d	\$100	2.28	0.65	1.48
Livestock tax ^f	\$100	1.37	0.50	0.69
Death loss ^c	\$	287.00	0.02	5.74
Equipment repair ^c	\$	138.00	0.02	2.76
Building repair ^c	\$	210.00	0.01	2.10
Machine operation ^c	Head	1.00	3.34	3.34
Corn silage ^g	Tons	3.00	—	—
Clover hay ^g	Tons	2.45	—	—
Overhead winter labor ^h	Hours	378.00	—	—
Overhead spring labor ^h	Hours	276.90	—	—

TABLE 5.01 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Overhead summer labor ^h	Hours	148.30	—	—
Overhead fall labor ^h	Hours	148.30	—	—
Variable winter labor ^h	Hours	9.90	—	—
Variable spring labor ^h	Hours	7.40	—	—
Variable summer labor ^h	Hours	4.10	—	—
Variable fall labor ^h	Hours	4.10	—	—
Building space ^l	Sq. ft.	85.00	—	—
Bedding (straw) ^e	Tons	1.25	—	—
May-June pasture ^h	A.U.	1.00	—	—
July-September pasture ^h	A.U.	1.00	—	—
Total				\$ 56.44
Livestock investment per production period^l				
26 Dairy Cow	Head	1.00	227.50	\$ 227.50
Total				\$ 227.50
Fixed costs per year for establishment of facilities for a fifty-cow dairy herd:^k				
Real Estate	—	—	—	\$ 301.80
Non-real estate	—	—	—	780.00
Total				\$1081.80
Variable cost per cow per year for establishment of dairy facilities^k				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	10.00
Total				\$ 12.30
Variable costs per cow per year for expansion of facilities above the fifty-cow capacity^k				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	26 67
Total				\$ 28.97

^aThe cow was assumed to weigh 1,200 pounds and to produce milk with 3.5 per cent butterfat.

^bReceipts for milk of \$5.68, \$5.41, and \$5.50 per hundred-weight, net after marketing charges for Areas I, II, and III, respectively, depend on the milk production per cow as determined by the particular feed ration used. Prices for milk were for the calendar year 1968 as taken from **Compilation of Statistical Information**, Annual Summary (Bristol, Tennessee: Appalachian Milk Market Area Administration, 1968), p. 4; **Complete Summary of Sales and Other Statistical Data: 1968**, DCSA No. 35 (Pittsburgh: Dairymen's Co-operative Sales Association, 1969), p. 11; **Compilation of Statistical Material Pertinent to Federal Order No. 3: Washington, D. C. Market Area**, Annual Report (Alexandria, Virginia: Federal Milk Marketing Administration, 1969), p. 5. Marketing charges were based on unpublished data provided by Joseph Bacha, a graduate student doing research on milk marketing, Division of Resource Management, West Virginia University.

^cBased on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), Appendix Table 24, p. 132. Death loss and equipment and building repair are expressed as a percentage of purchase value. Death loss for calves is reflected in the bob calf receipts.

^dFor cost data used, see Appendix Table 7, p. 85. Insurance is based on average animal value of \$227.50.

^eSee footnote c, Table 1.01, p. 11.

^fSee Appendix Table 11, p. 92 for tax data. The tax rate in the study areas is based on 60 per cent of the appraised value of assets held on July 1.

^gThe five rations presented were based on Nesselroad, *loc. cit.*, as converted from T.D.N. measures to units preferred. See Appendix Table 10, p. 91 for animal unit equivalents used to determine pasture requirements.

^hThe same procedure used by Nesselroad, *op cit.*, Table 25, pp. 135-137 was followed in determining labor requirements. A three-unit milking system with an eight-stall Herringbone feeding set-up were assumed to be associated with the loose-housing. Further, no automatic manure handling or forage feeding systems were assumed. Labor data were based on **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Tables 3-4, pp. 13-20.

ⁱBased on R. C. Angus and W. L. Barr, **Pennsylvania Farm Planning Handbook**, A.E. & R.S. Publication (University Park: The Pennsylvania State University, 1962), p. 303.

^jAn average of purchase value, \$287, and salvage value, \$168, was used for the animal value.

^kIt was assumed that existing buildings on the farms would serve as resting, feeding, and maternity barns. To establish a dairy enterprise, it was assumed that the farmer would need to construct a milking parlor, milk room, and sewerage system; in addition, all the milking equipment was assumed to be purchased new. A cost for paving and bulk tank was assumed to be incurred for each cow brought into the herd. Since these costs assumed a herd size of fifty cows, any cows added to the herd were assumed to require additional expansion costs. All of these above stated costs were depreciated to establish an annual cost per activity. Based on **Agricultural Planning Data for the Northeastern United States**, *op cit.*, Table 32 and 34, pp. 57, 59. Initial total capital outlays were estimated to be: (1) establishment costs of facilities for a fifty-cow dairy, \$12,096; (2) variable costs of facilities per cow, \$106; and (3) expansion costs of facilities per cow above the fifty-cow capacity, \$206.

^lItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 5.02

Estimated Annual Costs and Returns for a Dairy Cow Enterprise, Utilizing a Loose-Housing System and Feeding a Ration of Oats, Corn-and-Cob Meal, Soybean Oil Meal, Corn Silage, and Clover Hay (1:30 Grain: Milk Ratio) for 10,000 Pounds Milk Production.^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Milk	Cwt.	100.00	—	—
Cull cow (0.25 head)	Cwt.	3.00	14.00	\$ 42.00
Bob calf	Cwt.	0.50	20.00	10.00

Total				\$ 52.00
Expenses:				
Minerals and salt	Cwt.	0.31	3.30	\$ 1.02
Veterinary and medicine	Head	1.00	4.92	4.92
Hauling and marketing	Cwt.	3.50	0.75	2.63
Electricity	Kwh.	188.00	0.02	3.76
Breeding fee	Head	1.00	6.00	6.00
Milk testing	Head	1.00	6.00	6.00
Dairy supplies	Head	1.00	16.00	16.00
Livestock insurance	\$100	2.28	0.65	1.48
Livestock tax	\$100	1.37	0.50	0.69
Death loss	\$	287.00	0.02	5.74
Equipment repair	\$	138.00	0.02	2.76
Building repair	\$	210.00	0.01	2.10
Machine operation	Head	1.00	3.34	3.34
Corn silage	Tons	2.97	—	—
Clover hay	Tons	2.42	—	—

Item	Unit	Amount	Dollars or Rate	Value
Oats	Bushels	7.50	—	—
Corn-and-cob meal	Bushels	3.25	—	—
Soybean oil meal	Cwt.	0.20	5.01	1.00
Feed grinding	Cwt.	4.90	0.18	0.88
Overhead winter labor	Hours	378.00	—	—
Overhead spring labor	Hours	276.90	—	—
Overhead summer labor	Hours	148.30	—	—
Overhead fall labor	Hours	148.30	—	—
Variable winter labor	Hours	9.90	—	—
Variable spring labor	Hours	7.40	—	—
Variable summer labor	Hours	4.10	—	—
Variable fall labor	Hours	4.10	—	—
Building space	Sq. ft.	85.00	—	—
Bedding (straw)	Tons	1.25	—	—
May-June pasture	A.U.	0.99	—	—
July-September pasture	A.U.	0.99	—	—
				\$ 58.32
Livestock investment per production period:				
Dairy cow	Head	1.00	227.50	\$ 227.50
				\$ 227.50

TABLE 5.02 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Fixed cost per year for establishment of facilities for a fifty-cow dairy herd:				
Real estate	—	—	—	\$ 301.80
Non-real estate	—	—	—	780.00

Total				\$1081.80
Variable costs per cow per year for establishment of dairy facilities:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	10.00

Total				\$ 12.30
Variable cost per cow per year for expansion of facilities above the fifty-cow capacity:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	26.67

Total				\$ 28.97

*See Table 5.01 for assumptions and documentation.

TABLE 5.03

Estimated Annual Costs and Returns for a Dairy Cow Enterprise, Utilizing a Loose-Housing System and Feeding a Ration of Oats, Corn-and-Cob Meal, Soybean Oil Meal, Corn Silage, and Clover Hay (1:11 Grain: Milk Ratio) for 11,000 Pounds Milk Production^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Milk	Cwt.	110.00	—	—
Cull cow (0.25 head)	Cwt.	3.00	14.00	\$ 42.00
Bob calf	Cwt.	0.50	20.00	10.00
Total				\$ 52.00
Expenses:				
Minerals and salt	Cwt.	0.31	3.30	\$ 1.02
Veterinary and medicine	Head	1.00	4.92	4.92
Hauling and marketing	Cwt.	3.50	0.75	2.63
Electricity	Kwh.	188.00	0.02	3.76
Breeding fee	Head	1.00	6.00	6.00
Milk testing	Head	1.00	6.00	6.00
Dairy supplies	Head	1.00	16.00	16.00
Livestock insurance	\$100	2.28	0.65	1.48
Livestock tax	\$100	1.37	0.50	0.69
Death loss	\$	287.00	0.02	5.74
Equipment repair	\$	138.00	0.02	2.76
Building repair	\$	210.00	0.01	2.10
Machine operation	Head	1.00	3.34	3.34
Corn silage	Tons	2.95	—	—
Clover hay	Tons	2.41	—	—
Oats	Bushels	23.50	—	—

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TABLE 5.03 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Corn-and-cob meal	Bushels	10.00	—	—
Soybean oil meal	Cwt.	0.60	5.01	3.01
Feed grinding	Cwt.	15.10	0.18	2.72
Overhead winter labor	Hours	378.00	—	—
Overhead spring labor	Hours	276.90	—	—
Overhead summer labor	Hours	148.30	—	—
Overhead fall labor	Hours	148.30	—	—
Variable winter labor	Hours	9.90	—	—
Variable spring labor	Hours	7.40	—	—
Variable summer labor	Hours	4.10	—	—
Variable fall labor	Hours	4.10	—	—
Building space	Sq. ft.	85.00	—	—
Bedding (straw)	Tons	1.25	—	—
May-June pasture	A.U.	0.98	—	—
July-September pasture	A.U.	0.98	—	—

Total				\$ 62.17
Livestock investment per production period:				
Dairy cow	Head	1.00	227.50	\$ 227.50

Total				\$ 227.50
Fixed costs per year for establishment of facilities for a fifty-cow dairy herd:				
Real estate	—	—	—	\$ 301.80
Non-real estate	—	—	—	780.00

Total				\$1081.80

Item	Unit	Amount	Dollars or Rate	Value
Variable cost per cow per year for establishment of dairy facilities:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	10.00
Total				12.30
Variable costs per cow per year for expansion of facilities above the fifty-cow capacity:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	26.67
Total				\$ 28.97

^aSee Table 5.01 for assumptions and documentation.

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TABLE 5.04

Estimated Annual Costs and Returns for a Dairy Cow Enterprise, Utilizing a Loose-Housing System and Feeding a Ration of Oats, Corn-and-Cob Meal, Soybean Oil Meal, Corn Silage, and Clover Hay (1:7 Grain:Milk Ratio) for 12,000 Pounds Milk Production^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Milk	Cwt.	120.00	—	—
Cull cow (0.25 head)	Cwt.	3.00	14.00	\$ 42.00
Bob calf	Cwt.	0.50	20.00	10.00
Total				\$ 52.00

TABLE 5.04 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Expenses:				
Minerals and salt	Cwt.	0.31	3.30	\$ 1.02
Veterinary and medicine	Head	1.00	4.92	4.92
Hauling and marketing	Cwt.	3.50	0.75	2.63
Electricity	Kwh.	188.00	0.02	3.76
Breeding fee	Head	1.00	6.00	6.00
Milk testing	Head	1.00	6.00	6.00
Dairy supplies	Head	1.00	16.00	16.00
Livestock insurance	\$100	2.28	0.65	1.48
Livestock tax	\$100	1.37	0.50	0.69
Death loss	\$	287.00	0.02	5.74
Equipment repair	\$	138.00	0.02	2.76
Building repair	\$	210.00	0.01	2.10
Machine operation	Head	1.00	3.34	3.34
Corn silage	Tons	2.80	—	—
Clover hay	Tons	2.29	—	—
Oats	Bushels	39.00	—	—
Corn-and-cob meal	Bushels	16.50	—	—
Soybean oil meal	Cwt.	0.90	5.01	4.51
Feed grinding	Cwt.	24.94	0.18	4.49
Overhead winter labor	Hours	378.00	—	—
Overhead spring labor	Hours	276.90	—	—
Overhead summer labor	Hours	148.30	—	—
Overhead fall labor	Hours	148.30	—	—
Variable winter labor	Hours	9.90	—	—
Variable spring labor	Hours	7.40	—	—
Variable summer labor	Hours	4.10	—	—

Item	Unit	Amount	Dollars or Rate	Value
Variable fall labor	Hours	4.10	—	—
Building space	Sq. ft.	85.00	—	—
Bedding (straw)	Tons	1.25	—	—
May-June pasture	A.U.	0.94	—	—
July-September pasture	A.U.	0.94	—	—

Total				\$ 65.44
Livestock investment per production period:				
Dairy Cow	Head	1.00	227.50	\$ 227.50

Total				\$ 227.50
Fixed costs per year for establishment of facilities for a fifty-cow dairy herd:				
Real estate	—	—	—	\$ 301.80
Non-real estate	—	—	—	780.00

Total				\$1081.80
Variable costs per cow per year for establishment of daily facilities:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	10.00

Total				\$ 12.30
Variable costs per cow per year for expansion of facilities above the fifty-cow capacity:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	26.67

Total				\$ 28.97

*See Table 5.01 for assumptions and documentation.

TABLE 5.05

Estimated Annual Costs and Returns for a Dairy Cow Enterprise, Utilizing a Loose-Housing System and Feeding a Ration of Oats, Corn-and-Cob Meal, Soybean Oil Meal, Corn Silage, and Clover Hay (1:4.75 Grain:Milk Ratio) for 13,000 Pounds Milk Production*

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Milk	Cwt.	130.00	—	—
Cull cow (0.25 head)	Cwt.	3.00	14.00	\$ 42.00
Bob calf	Cwt.	0.50	20.00	10.00

	Total			\$ 52.00
Expenses:				
36 Minerals and salt	Cwt.	0.31	3.30	\$ 1.02
Veterinary and medicine	Head	1.00	4.92	4.92
Hauling and marketing	Cwt.	3.50	0.75	2.63
Electricity	Kwh.	188.00	0.02	3.76
Breeding fee	Head	1.00	6.00	6.00
Milk testing	Head	1.00	6.00	6.00
Dairy supplies	Head	1.00	16.00	16.00
Livestock insurance	\$100	2.28	0.65	1.48
Livestock tax	\$100	1.37	0.50	0.69
Death loss	\$	287.00	0.02	5.74
Equipment repair	\$	138.00	0.02	2.76
Building repair	\$	210.00	0.01	2.10
Machine operation	Head	1.00	3.34	3.34
Corn silage	Tons	2.48	—	—
Clover hay	Tons	2.02	—	—

Item	Unit	Amount	Dollars or Rate	Value
Oats	Bushels	62.50	—	—
Corn-and-cob meal	Bushels	27.00	—	—
Soybean oil meal	Cwt.	1.50	5.01	7.52
Feed grinding	Cwt.	40.39	0.18	7.27
Overhead winter labor	Hours	378.00	—	—
Overhead spring labor	Hours	276.90	—	—
Overhead summer labor	Hours	148.30	—	—
Overhead fall labor	Hours	148.30	—	—
Variable winter labor	Hours	9.90	—	—
Variable spring labor	Hours	7.40	—	—
Variable summer labor	Hours	4.10	—	—
Variable fall labor	Hours	4.10	—	—
Building space	Sq. ft.	85.00	—	—
Bedding (straw)	Tons	1.25	—	—
May-June pasture	A.U.	0.83	—	—
July-September pasture	A.U.	0.83	—	—

Total				\$ 71.23
Livestock investment per production period:				
Dairy cow	Head	1.00	227.50	\$ 227.50

Total				\$ 227.50
Fixed costs per year for establishment of facilities for a fifty-cow dairy herd:				
Real estate	—	—	—	\$ 301.80
Non-real estate	—	—	—	780.00

Total				\$1081.80

TABLE 5.05 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Variable costs per cow per year for establishment of dairy facilities:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	10.00

Total				\$ 12.30
Variable costs per cow per year for expansion of facilities above the fifty-cow capacity:				
Real estate	—	—	—	\$ 2.30
Non-real estate	—	—	—	26.67

Total				\$ 28.97

*See Table 5.01 for assumptions and documentation.

TABLE 6.01

Estimated Annual Costs and Returns for a Dairy Cow Replacement Enterprise, Using a Ration of Commercial Feeds, Corn Silage, and Clover Hay

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Bred dairy cow replacement	Head	1.00	—	—
Sterile heifer (0.12 head) ^a	Cwt.	1.08	23.00	\$ 24.84

Total				\$ 24.84
Expenses:				
Heifer calf	Cwt.	0.80	20.00	\$ 16.00
Mineral and salt ^b	Cwt.	0.31	3.30	1.02
Veterinary and medicine ^a	Head	1.00	1.50	1.50
Hauling and marketing (cull) ^b	Cwt.	1.08	0.75	0.81
Electricity ^{a, b}	Kwh.	72.00	0.02	1.44
Breeding fee ^a	Head	1.00	7.00	7.00
Livestock insurance ^b	\$100	1.52	0.65	0.99
Livestock tax ^c	\$100	0.91	0.50	0.46
Death loss ^a	Head	1.00	1.25	1.25
Equipment ^d	Head	1.00	1.00	1.00
Equipment repair ^a	\$	10.00	0.01	0.10
Building repair ^a	\$	196.00	0.01	1.96
Machine operation ^a	Head	1.00	1.50	1.50
Corn silage ^a	Tons	3.94	—	—
Clover hay ^a	Tons	1.24	—	—
Commercial feed ^{a, b}	Cwt.	7.50	4.90	36.75
Milk replacer ^b	Cwt.	0.25	21.20	5.30
Winter labor ^a	Hours	22.20	—	—

TABLE 6.01 (Continued)

Item	Unit	Amount	Dollars or Rate	Value ^b
Spring labor ^a	Hours	9.60	—	—
Summer labor ^a	Hours	5.70	—	—
Fall labor ^a	Hours	6.10	—	—
Building space ^c	Sq. ft.	85.00	—	—
Bedding (straw) ^a	Tons	0.50	—	—
May-June pasture ^f	A.U.	0.70	—	—
July-September pasture ^f	A.U.	0.70	—	—

Total				\$ 77.08
Livestock investment per production period:^g				
Replacement heifer	Head	1.00	151.50	\$ 151.50

Total				\$ 151.50

^aBased on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1968), Appendix Table 26, p. 138. Equipment and building repair are expressed as a percentage of purchase value.

^bFor cost data used, see Appendix Table 7, p. 85. Also, see footnote c, Table 1.01, p. 11. Insurance is based on average livestock value.

^cFor tax data, see Appendix Table 11, p. 92. The tax rate in the study areas is based on 60 per cent of the appraised value of assets held as of July 1.

^dAgricultural Planning Data for the Northeastern United

States, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Table 4, p. 69. The equipment cost appearing is the new value depreciated for ten years.

^eBased on R. C. Angus and W. L. Barr, **Pennsylvania Farm Planning Handbook**, A.E. & R.S. Publication (University Park: The Pennsylvania State University, 1962), p. 303.

^fFor animal units defined, see Appendix Table 10, p. 91.

^gLivestock investment is based on an average of the values of the calf and bred replacement.

^hItems having no specified value indicated may be raised, owned, rented, or purchased at varying costs (see footnote b above for specific price data).

TABLE 7.01

Estimated Annual Costs and Returns for a Sow-Feeder Pig Enterprise, with the Sow Farrowing Twice Per Year or Weaning a Total of Sixteen Marketable, Fifty-Pound Feeder Pigs Per Year and Using a Ration of All Commercial Feeds^a

Item	Unit	Amount	Dollars or Rate	Value ¹
Receipts:				
Feeder pigs (16.0 head)	Cwt.	8.00	24.00	\$ 192.00
Cull sows (0.33 head)	Cwt.	1.32	11.00	14.52
Cull boar (0.033 head)	Cwt.	0.15	10.00	1.50
Total				\$ 208.02
Expenses:				
Replacement gilt ^b	Head	0.33	75.00	\$ 25.00
Veterinary and medicine ^b	Head	1.00	14.65	14.65
Hauling and marketing (pigs) ^{b,c}	Head	16.00	0.50	8.00
Hauling and marketing (culls) ^{b,c}	Cwt.	1.48	0.50	0.74
Electricity ^{d,e}	Kwh.	100.00	0.02	2.00
Livestock insurance ^e	\$100	0.70	0.65	0.46
Livestock tax ^f	\$100	0.42	0.50	0.21
Death loss ^d	Head	1.00	1.64	1.64
Equipment ^d	Head	1.00	2.50	2.50
Equipment repair ^d	\$	25.00	0.01	0.25
Building repair ^d	Head	1.00	1.75	1.75
Machine operation ^d	Head	1.00	2.50	2.50
Commercial sow feed (15%) ^{b,e}	Cwt.	22.00	3.87	85.14
Pig prestarter ^{b,e}	Cwt.	3.00	4.95	14.85
Pig developer ^{b,e}	Cwt.	5.00	4.56	22.80
Winter labor ^d	Hours	12.50	—	—
Spring labor ^d	Hours	5.80	—	—

TABLE 7.01 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Summer labor ^d	Hours	3.30	—	—
Fall labor ^d	Hours	8.40	—	—
Building space, farrowing ^e	Sq. ft.	16.00	—	—
Building space, nursing ^e	Sq. ft.	46.00	—	—
Building space, shelter ^e	Sq. ft.	15.00	—	—
Bedding (straw) ^d	Tons	0.25	—	—
May-June pasture ^h	A.U.	0.21	—	—
July-September pasture ^h	A.U.	0.21	—	—
Total				\$ 182.49
Livestock investment per production period:^{a, b}				
Sow	Head	0.67	59.50	\$ 39.87
Boar	Head	1.00	4.83	4.83
Total				\$ 44.70

^aThe sow was assumed to remain in the herd three productive year after being purchased for \$75.00 at 250 pounds as a gilt. The boar was assumed to be purchased for \$100.00 and to service a fifteen-sow herd for two years, at which time he was sold. The boar and sow investment were both an average of original and salvage values.

^bBased on A. L. Barr and D. J. Horvath, **Four Systems of Feeder Pig Production for West Virginia**, West Virginia University Cooperative Extension Service Miscellaneous Publication 154 (Morgantown: West Virginia University, 1962), Table 2 and 3, pp. 6-7. Only 0.67 sow was expressed for investment purposes since 0.33 gilt was assumed to be purchased annually (see expenses) on the average.

^cW. K. Waters, **Cost and Returns Guide for Livestock Enterprises in Southwestern Pennsylvania**, Farm Management No. 34 (University Park: The Pennsylvania State University, Cooperative Extension Service, 1966), p. 12.

^dAgricultural Planning Data for the Northeast United States,

Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Table 45, p. 77. Death loss was assumed to be 2 per cent of sow and boar value and 3 per cent of gilt value. Equipment cost, as appearing, is the new value depreciated for ten years. Equipment and building repair are expressed as a percentage of new value.

^eFor cost data used, see Appendix Table 7, p. 85. Insurance is based on average livestock value.

^fSee Appendix Table 11, p. 92 for tax data. The tax rate in the study areas is based on 60 per cent of the appraised value of assets held as of July 1.

^gBuilding space requirements are based on a fifteen-sow herd. For source, see footnote d, above.

^hSee Appendix Table 10, p. 91 for animal units defined.

ⁱItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 7.02

Estimated Annual Costs and Returns for a Sow-Feeder Pig Enterprise, with the Sow Farrowing Twice Per Year or Weaning a Total of Sixteen Marketable, Fifty-Pound Feeder Pigs Per Year and Using a Ration of Corn Grain and Commercial Feeds^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Feeder pigs (16.0 head)	Cwt.	8.00	24.00	\$ 192.00
Cull sows (0.33 head)	Cwt.	1.32	11.00	14.52
Cull boar (0.033 head)	Cwt.	0.15	10.00	1.50
				\$ 208.02
Expenses:				
43 Replacement gilt	Head	0.33	75.00	\$ 25.00
Veterinary and medicine	Head	1.00	14.65	14.65
Hauling and marketing (pigs)	Head	16.00	0.50	8.00
Hauling and marketing (culls)	Cwt.	1.47	0.50	0.74
Electricity	Kwh.	100.00	0.02	2.00
Livestock insurance	\$100	0.70	0.65	0.46
Livestock tax	\$100	0.42	0.50	0.21
Death loss	Head	1.00	1.64	1.64
Equipment	Head	1.00	2.50	2.50
Equipment repair	\$	25.00	0.01	0.25
Building repair	Head	1.00	1.75	1.75
Machine operation	Head	1.00	2.50	2.50
Corn	Bushels	35.00	—	—
Commercial supplement (38%)	Cwt.	4.00	6.08	24.32
Corn shelling	Cwt.	19.60	0.07	1.37

TABLE 7.02 (Continued)

Item	Unit	Amount	Dollars or Rate	Value
Feed grinding	Cwt.	23.60	0.18	4.25
Pig prestarter	Cwt.	3.00	4.95	14.85
Pig developer	Cwt.	5.00	4.56	22.80
Winter labor	Hours	12.50	—	—
Spring labor	Hours	5.80	—	—
Summer labor	Hours	3.30	—	—
Fall labor	Hours	8.40	—	—
Building space, farrowing	Sq. ft.	16.00	—	—
Building space, nursing	Sq. ft.	46.00	—	—
Building space, shelter	Sq. ft.	15.00	—	—
Bedding (straw)	Tons	0.25	—	—
May-June pasture	A.U.	0.21	—	—
July-September pasture	A.U.	0.21	—	—
				\$ 127.29
Livestock investment per production period:				
Sow	Head	0.67	59.50	\$ 39.87
Boar	Head	1.00	4.83	4.83
				\$ 44.70

*See Table 7.01 for assumptions and documentation.

TABLE 8.01

Estimated Annual Costs and Returns for Producing a February Market Hog, Weighing 220 Pounds (U.S. No. 1-2) and Using a Ration of Corn, Commercial Supplement, and Clover Hay^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Market hog, February ^b	Cwt.	2.20	20.60	\$ 45.32
Total				\$ 45.32
Expenses:				
Feeder pig	Cwt.	0.50	24.00	\$ 12.00
Veterinary and medicine ^e	Head	1.00	0.85	0.85
Hauling and marketing ^d	Cwt.	2.20	0.50	1.10
Electricity ^{e, g}	Kwh.	10.00	0.02	0.20
Death loss ^e	\$	12.00	0.03	0.36
Equipment ^e	Head	1.00	0.25	0.25
Equipment repair ^e	\$	2.50	0.01	0.03
Building repair ^e	Head	1.00	0.07	0.07
Machine operation ^e	Head	1.00	0.30	0.30
Clover hay ^{e, f}	Tons	0.02	—	—
Corn ^{e, f}	Bushels	10.00	—	—
Commercial supplement (38.0%) ^{e, g, f}	Cwt.	1.00	6.08	6.08
Corn shelling ^e	Cwt.	5.60	0.07	0.39
Feed grinding ^e	Cwt.	6.60	0.18	1.19
Fall labor ^e	Hours	0.07	—	—
Winter labor ^e	Hours	0.37	—	—
Building space ^e	Sq. ft.	8.00	—	—
Bedding (straw) ^e	Tons	0.03	—	—
Total				\$ 22.82

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(Footnotes for Table 8.10)

^aA fifty-pound feeder pig was assumed to be fed to 220 pounds in a 105-day period.

^bSee Appendix Table 6, p. 85 for hog prices used.

^cBased on **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Table 46, p. 79. Death loss is assumed to be 3 per cent of purchase value. Equipment cost, as appearing, is new value depreciated for ten years while equipment repair is figured at 1 per cent of new value.

^dW. K. Waters, **Cost and Returns Guide for Livestock Enterprises in Southwestern Pennsylvania**, Farm Management No. 34 (University Park: The Pennsylvania State University, Cooperative Extension Service, 1966), p. 12.

^eSee Appendix Table 7, p. 85 for cost data used.

^fFrank B. Morrison, **Feed and Feeding** (Ithaca: The Morrison Publishing Co., 1956), p. 1126. The ration was increased 5.0 per cent, by weight, with hay.

^gItems for which no specified value is indicated may be raised, owned, rented, or purchased at varying costs (see Appendix Table 7, p. 85).

TABLE 8.02

Estimated Annual Costs and Returns for Producing a July Market Hog, Weighing 220 Pounds (U.S. No. 1-2) and Using a Ration of Corn, Commercial Supplement, and Clover Hay^a

Item	Unit	Amount	Dollars or Rate	Value
Receipts:				
Market hog, July	Cwt.	2.20	22.94	\$ 50.47

	Total			\$ 50.47
Expenses:				
Feeder pig	Cwt.	0.50	24.00	\$ 12.00
Veterinary and medicine	Head	1.00	0.85	0.85
Hauling and marketing	Cwt.	2.20	0.50	1.10
Electricity	Kwh.	10.00	0.02	0.20
Livestock tax ^b	\$100	0.30	0.50	0.15
Death loss	\$	12.00	0.03	0.36
Equipment	Head	1.00	0.25	0.25
Equipment repair	\$	2.50	0.01	0.03
Building repair	Head	1.00	0.07	0.07
Machine operation	Head	1.00	0.30	0.30
Clover hay	Tons	0.02	—	—
Corn	Bushels	10.00	—	—
Commercial supplement (38.0%)	Cwt.	1.00	6.08	6.08
Corn shelling	Cwt.	5.60	0.07	0.39
Feed grinding	Cwt.	6.60	0.18	1.19
Spring labor	Hours	0.43	—	—
Building space	Sq. ft.	8.00	—	—
Bedding (straw)	Tons	0.03	—	—

	Total			\$ 22.97

^aSee Table 8.01 for assumptions and documentation.

^bSee Appendix Table 11, p. 92 for tax used. The tax rate in the study areas is based on 60 per cent of the appraised value of assets held as of July 1.

TABLE 9.01
Estimated Requirements and Production for Corn and Small Grains, Huntington Soil, Study Area I,
Land Use Capability Class I, Bottomland^a

Item	Corn grain	Corn silage	Oats ^f	Wheat ^f	Barley ^f
				Seeded with clover, only	
Production per acre:					
Bushels, grain	140.0		55.0	30.0	45.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^g	or 2.5 ^g	or 2.5 ^g
Tons, ensilage		22.0			
Expenses:^b					
Seed ^e	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer ^d	26.18	36.99	11.36	11.36	11.36
Lime ^d	2.00	2.00	2.00	2.00	2.00
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor ^e	4.05	6.75	4.65	4.12	4.39
Machinery ^e	2.28	4.92	3.09	2.52	2.81
Total	\$44.57	\$60.72	\$31.05 ^g	\$30.06 ^g	\$30.91 ^g
Labor (hours^e):					
Spring	3.7	3.4	2.7	—	—
Summer	—	—	5.3 ^g	4.6 ^g	5.0 ^g
Fall	1.9	5.9	—	2.7	2.7

^aCorn and small grain yields were based on estimates by Dr. Clifford Porter and Dr. Collins Veatch, agronomists, West Virginia University. The estimates were for standing field yields with adjustments made for grains at 15.5% moisture, silage to 30.0% dry matter, and hay to 88.0% dry matter and taking into consideration soil characterization, climatic conditions, elevation, and other physical differentials.

^bPrice data used, other than tractor and machinery operating expenses, are presented in Appendix Table 7, p. 85.

^cSeeding rates were based on Clifford D. Porter, **Field Crop Varieties for West Virginia**, West Virginia University Cooperative Extension Service (Morgantown: West Virginia University, 1969), pp. 7-8.

^dThe calcium, phosphorus, and potassium levels of each soil were based on weighted results of soil samples analyzed in the testing laboratories at West Virginia University; the data were provided by Dr. Carl Engle, agronomist, West Virginia University. Fertilization rates were based on **West Virginia Univer-**

sity Fertilizer Recommendations for Silage Corn and Field Corn and Fertilizer Recommendation Table for Field Crops, West Virginia University Agricultural Experiment Station and Cooperative Extension Service (Morgantown: West Virginia University, 1969).

^eTractor, machinery, and labor data were based on **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Table 6-14, pp. 22-31. Adjustments were made for local conditions and yields.

^fExpenses for seed were estimated to be \$0.20 greater if orchard grass were included in the clover-small grain mixture.

^gTotal expenses were estimated to be \$29.62, \$29.73, and \$30.02, and summer labor requirements were estimated to be 4.6 hours for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.02
Estimated Requirements and Production for Corn and Small Grains, Pope Soil, Study Area I,
Land Use Capability Class II, Bottomland^a

Item	Corn grain	Corn silage	Oats ^b	Wheat ^b	Barley ^b
			Seeded with clover, only		
Production per acre:					
Bushels, grain	125.0		55.0	27.0	37.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^c	or 2.5 ^c	or 2.5 ^c
Tons, ensilage		20.5			
Expenses:					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	23.39	37.26	14.33	14.53	14.53
Lime	2.88	2.88	2.88	2.88	2.88
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	4.03	6.66	4.65	4.12	4.22
Machinery	2.18	4.57	3.09	2.52	2.60
Total	----- \$42.54	----- \$61.43	----- \$35.10 ^c	----- \$34.11 ^c	----- \$34.58 ^c
Labor (hours):					
Spring	3.9	4.0	2.7	—	—
Summer	—	—	5.3 ^c	4.6 ^c	4.9 ^c
Fall	1.7	5.3	—	2.7	2.7

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cTotal expenses were estimated to be \$33.67, \$33.78, \$34.07, and summer labor requirements were estimated to be 4.6 hours for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.03

Estimated Requirements and Production for Corn and Small Grains, Monongahela Soil, Study Area I, Land Use Capability Class II, Upland^a

Item	Corn grain	Corn silage	Oats ^b	Wheat ^b		Barley ^b	
				Seeded with clover, only			
Production per acre:							
Bushels, grain	110.0		50.0	30.0	45.0		
Tons, straw			& 2.0	& 2.0	& 2.0		
Tons, hay			or 2.5 ^c	or 2.5 ^c	or 2.5 ^c		
Tons, ensilage		18.5					
Expenses:							
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95		
Fertilizer	24.10	33.75	11.36	11.36	11.36		
Lime	2.38	2.38	2.38	2.38	2.38		
Spray materials	6.75	6.75	—	—	—		
Twine	—	—	2.40	2.40	2.40		
Tractor	3.88	5.83	4.51	4.12	4.39		
Machinery	2.02	3.97	2.93	2.52	2.81		
Total	\$12.44	\$55.99	\$31.13 ^c	\$30.44 ^c	\$31.29 ^c		
Labor (hours):							
Spring	3.9	3.6	2.7	—	—		
Summer	—	—	5.7 ^e	4.6 ^c	5.0 ^c		
Fall	1.5	4.5	—	2.7	2.7		

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cTotal expenses were estimated to be \$30.00, \$30.11, \$30.40, and summer labor requirements were estimated to be 4.6 hours for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.04

Estimated Requirements and Production for Corn and Small Grains' Litz-Calvin Soils, Study Area I, Land Use Capability Classes III and IV, Upland^a

Item	Corn grain ^{b,d}	Corn Silage ^{b,d}	Oats ^{b,c,e,d}	Wheat ^{b,c,d}	Barley ^{b,c,d}
				Seeded with clover, only	
Production per acre:					
Bushels, grain	105.0		45.0	25.0	37.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5	or 2.5	or 2.5
Tons, ensilage		17.0			
Expenses:^d					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	24.10	33.75	11.36	11.36	11.36
Lime	2.50	2.50	2.50	2.50	2.50
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	4.39	6.18	4.83	4.53	4.64
Machinery	2.45	4.07	3.09	2.77	2.89
Total	\$43.50	\$56.56	\$31.73^{e,f}	\$31.22^{e,f}	\$31.74^{e,f}
Labor (hours):^d					
Spring	4.5	4.2	3.0 ^{e,f}	—	—
Summer	—	—	5.5 ^{e,f}	5.0 ^{e,f}	5.2 ^{e,f}
Fall	1.6	4.4	—	3.0 ^{e,f}	3.0 ^{e,f}

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^aSee footnotes a through e, Table 9.01, p. 49.

^bCorn yields are applicable to only Class III land; yields for small grains are applicable to both Classes III and IV land.

^cSee footnote f, Table 9.01, p. 49.

^dThe above estimated budgets were for Class III land; therefore, tractor, machinery, and labor inputs reflect a ten per cent increase above Classes I and II land. Tractor, machinery, and labor inputs were estimated to be twenty-five per cent greater for Class IV land as compared to Classes I and II land. Based on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), pp. 21-22.

^eOn Class IV lands, with adjusted requirements (see footnote d, above), oats, wheat, and barley were estimated to have total expenses of \$33.41, \$32.82, and \$33.38, respectively, fall or spring labor requirements of 3.9 hours, and summer labor requirements of 6.2, 5.7, and 5.9 hours, respectively.

^fOn Class III land, with adjusted inputs (see footnote d, above) and if harvested as hay, oats, wheat, and barley were estimated to have total expenses of \$30.09, \$30.20, and \$30.49 and summer labor requirements of 5.1 hours, respectively. On Class IV land, if harvested as hay and with inputs adjusted, oats, wheat, and barley were estimated to have total expenses of \$31.55, \$31.66, and \$31.95, respectively, fall or spring labor requirements of 3.9 hours, and summer labor requirements of 6.4 hours, respectively.

TABLE 9.05

**Estimated Requirements and Production for Corn and Small Grains, Pope-Philo Soils, Study Area II,
Land Used Capability Class I, Bottomland^a**

Item	Corn grain	Corn silage	Oats ^b	Wheat ^b		Barley ^b	
				Seeded with clover, only			
Production per acre:							
Bushels, grain	115.0		65.0	30.0		40.0	
Tons, straw			& 2.0	& 2.0		& 2.0	
Tons, hay			or 2.5 ^c	or 2.5 ^c		or 2.5 ^c	
Tons, ensilage		20.0					
Expenses:							
Seed	\$3.31	\$ 3.31	\$ 7.55	\$ 7.66		\$ 7.95	
Fertilizer	24.10	33.75	11.36	11.36		11.36	
Lime	3.00	3.00	3.00	3.00		3.00	
Spray materials	6.75	6.75	—	—		—	
Twine	—	—	2.40	2.40		2.40	
Tractor	3.76	6.13	4.91	4.12		4.26	
Machinery	1.98	4.34	3.36	2.52		2.67	
Total	\$42.90	\$57.28	\$32.58 ^c	\$31.06 ^c		\$31.64 ^c	
Labor (hours):							
Spring	3.7	3.4	2.7	—		—	
Summer	—	—	5.7 ^c	4.6 ^c		4.8 ^c	
Fall	1.6	5.1	—	2.7		2.7	

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cTotal expenses for oats, wheat, and barley were estimated

to be \$30.62, \$30.73, \$31.02, and summer labor requirements were estimated to be 4.6 hours, respectively, if harvested as hay.

TABLE 9.06
Estimated Requirements and Production for Corn and Small Grains, Atkins Soil, Study Area II,
Land Use Capability Class III, Bottomland^a

Item	Corn Grain	Corn Silage	Oats ^{b,c}	Wheat ^{b,c}	Barley ^{b,c}
Production per acre:			Seeded with clover, only		
Bushels, grain	100.0		60.0	25.0	32.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^d	or 2.5 ^d	or 2.5 ^d
Tons, ensilage		16.0			
Expenses:					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	24.10	33.75	11.36	11.36	11.36
Lime	3.75	3.75	3.75	3.75	3.75
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	3.93	5.41	4.80	4.12	4.15
Machinery	1.98	3.49	3.24	2.52	2.55
Total	\$43.82	\$56.46	\$33.10 ^d	\$31.81 ^d	\$32.16 ^d
Labor (hours):					
Spring	4.1	3.9	2.7	—	—
Summer	—	—	5.7 ^c	4.6 ^d	4.6 ^d
Fall	1.4	3.7	5.5 ^d	2.7	2.7

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cThough indicated as Class III land, no increases in tractor, machinery, and labor inputs were made for this particular

soil as Atkins soil is nearly level (see footnote d, Table 9.04, p. 53).

^dTotal expenses for oats, wheat, and barley were estimated to be \$31.37, \$31.48, and \$31.77, and summer labor requirements were estimated to be 4.6 hours, respectively, if harvested as hay.

TABLE 9.07
Estimated Requirements and Production for Corn and Small Grains, Monongahela Soil, Study Area II,
Land Use Capability Class II, Upland^a

Item	Corn grain	Corn silage	Oats ^b	Wheat ^b	Barley ^b
			Seeded with clover, only		
Production per acre:					
Bushels, grain	115.0		65.0	28.0	37.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^c	or 2.5 ^c	or 2.5 ^c
Tons, ensilage		19.0			
Expenses:					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	24.10	33.75	11.36	11.36	11.36
Lime	2.38	2.38	2.38	8¢ ^z	8¢ ^z
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	3.93	5.98	4.91	4.12	4.22
Machinery	2.09	4.12	3.36	2.52	2.63
Total	\$42.55	\$56.29	\$31.96 ^c	\$30.44 ^c	\$30.94 ^c
Labor (hours):					
Spring	3.9	3.6	2.7	—	—
Summer	—	—	5.7 ^c	4.6 ^c	4.7 ^c
Fall	1.6	4.7	—	2.7	2.7

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cTotal expenses were estimated to be \$30.00, \$30.11, \$30.40, and summer labor requirements were estimated to be 4.6 hours, for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.08

Estimated Requirements and Production for Corn and Small Grains, Dekalb-Lehew Soils, Study Area II, Land Use Capability Class III, Upland^a

Item	Corn grain ^c	Corn silage ^c	Oats ^{b,c}	Wheat ^{b,c}	Barley ^{b,c}
			Seeded with clover, only		
Production per acre:					
Bushels, grain	110.0		55.0	25.0	35.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^d	or 2.5 ^d	or 2.5 ^d
Tons, ensilage		17.0			
Expenses:					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	24.10	33.75	11.36	11.36	11.36
Lime	2.58	2.58	2.58	2.58	2.58
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	4.49	6.18	5.12	4.53	4.61
Machinery	2.31	4.07	3.40	2.77	2.86
Total	\$43.54	\$56.64	\$32.41^d	\$31.30^d	\$31.76^d
Labor (hours):					
Spring	4.5	4.2	3.0	—	—
Summer	—	—	5.8 ^d	5.1 ^d	5.1 ^d
Fall	1.7	4.4	—	3.0	3.0

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnotes f, Table 9.01, p. 49.

^cTractor, machinery, and labor inputs were adjusted for Class III land (see footnote d, Table 9.04 p. 53).

^dTotal expenses were estimated to be \$30.77, \$30.88, and \$31.17, and summer labor requirements were estimated to be 5.1 hours, for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.09
Estimated Requirements and Production for Small Grains, Belmont Soil, Study Area II,
Land Use Capability Class IV, Upland^a

Item	Oats ^{b,c}	Wheat ^{b,c}	Barley ^{b,c}
	Seeded with clover only		
Production per acre:			
Bushels, grain	65.0	30.0	40.0
Tons, straw	& 2.0	& 2.0	& 2.0
Tons, hay	or 2.5 ^d	or 2.5 ^d	or 2.5 ^d
Expenses:			
Seed	\$7.55	\$ 7.66	\$ 7.95
Fertilizer	14.53	14.53	14.53
Lime	2.00	2.00	2.00
Twine	2.40	2.40	2.40
Tractor	6.54	5.54	5.73
Machinery	4.40	3.35	3.54
Total	\$37.42 ^d	\$35.48 ^d	\$36.15 ^d
Labor (hours):			
Spring	3.9	—	—
Summer	7.1 ^d	5.8 ^d	6.0 ^d
Fall	—	3.9	3.9

^aSee footnotes a through e, Table 9.01, p. 49.

^bSee footnote f, Table 9.01, p. 49.

^cTractor, machinery, and labor inputs were adjusted for Class IV land (see footnote d, Table 9.04, p. 53).

^dTotal expenses were estimated to be \$34.81, \$34.92, and \$35.21, and summer labor requirements were estimated to be 5.7 hours, for oats, wheat, and barley, respectively, if harvested as hay.

TABLE 9.10

Estimated Requirements and Production for Corn and Small Grains, Frankstown-Frederick-Pickaway Soil, Study Area III, Land Use Capability Classes II, III, and IV, Upland^{a,b}

Item	Corn grain ^c	Corn silage ^c	Oats ^{d,f,h,i}	Wheat ^{d,f,h,i}	Barley ^{d,f,h,i}
Production per acre:					
Bushels, grain	120.0		60.0	30.0	45.0
Tons, straw			& 2.0	& 2.0	& 2.0
Tons, hay			or 2.5 ^{e,g,h,i}	or 2.5 ^{e,g,h,i}	or 2.5 ^{e,g,h,i}
Tons, ensilage		20.0			
Expenses:					
Seed	\$ 3.31	\$ 3.31	\$ 7.55	\$ 7.66	\$ 7.95
Fertilizer	24.10	33.75	11.36	11.36	11.36
Lime	1.88	1.88	1.88	1.88	1.88
Spray materials	6.75	6.75	—	—	—
Twine	—	—	2.40	2.40	2.40
Tractor	3.97	5.98	4.80	4.12	4.39
Machinery	2.13	4.12	3.24	2.52	2.81
Total	\$42.14	\$55.79	\$31.23 ^{e,f,i}	\$29.94 ^{e,f,i}	\$30.79 ^{e,f,i}
Labor (hours):					
Spring	3.9	3.6	2.7 ⁱ	—	—
Summer	—	—	5.5 ^{e,f,i}	4.6 ^{e,f,i}	5.0 ^{e,f,i}
Fall	1.6	4.7	—	2.7 ⁱ	2.7 ⁱ

^aSee footnotes a through e, Table 9.01, p. 49.

^bThe estimates presented above are for Class II land.

^cYields on Class III land were 110.0 bushels of corn grain and 19.0 tons of corn silage. With inputs adjusted for Class III land (see footnote d, Table 9.04, p. 53), corn grain was estimated to require \$42.79, 4.5 hours of spring labor, and 1.7 hours

of fall labor; corn silage was estimated to require \$57.06, 4.2 hours of spring labor, and 5.2 hours of fall labor.

^dSee footnote f, Table 9.01, p. 49.

^eOn Class II land, if harvested as hay, oats, wheat, and barley were estimated to have total expenses of \$29.50, \$29.61, and \$29.90, respectively, and summer labor requirements of 4.6 hours.

TABLE 9.10 (Continued)

^cThe same yields presented above were assumed for small grains on Class III land; as grains and with inputs adjusted for Class III land (see footnote d, Table 9.04, p. 53). Total expenses were estimated to be \$32.03, \$30.60, and \$31.58, respectively, spring or fall labor, 2.9 hours, and summer labor, 6.1, 5.1, and 5.5 hours respectively, for oats, wheat, and barley when harvested as grains.

^eIf harvested as hay on Class III land, total expenses were estimated to be \$30.07, \$30.18, and \$30.47 for oats, wheat, and barley, respectively, and labor requirements were estimated to be 2.9 hours in spring or fall and 5.1 hours in summer.

^bOats, wheat, and barley on Class IV land were estimated to have yields of 58.0, 28.0, and 40.0 bushels, respectively, and straw and hay yields were assumed to be the same as presented above. When harvested as grain, oats, wheat, and barley were estimated to have total expenses of \$33.66, \$32.19, and \$32.93, respectively, spring or fall labor requirements of 3.9 hours, and summer labor requirements of 6.8, 5.8, and 6.0 hours, respectively.

^fIf harvested as hay and with inputs adjusted for Class IV land (see footnote d, Table 9.04, p. 53), oats, wheat, and barley were estimated to have total expenses of \$31.52, \$31.63, and \$31.92, respectively, spring or fall labor requirements of 3.9 hours, and summer labor requirements of 5.7 hours.

TABLE 10.01
**Estimated Requirement and Production for Clover and Orchard Grass, Huntington Soil, Study Area I,
 Land Use Capability Class I, Bottomland**

Item	Clover, only, first production year	Clover, only, second production year ^e	Orchard grass, annual production
Production per acre:^a			
Tons, hay	4.0	2.85	3.7
Expenses:^b			
Fertilizer ^c	\$12.83	\$12.83	\$15.30
Lime ^c	2.00	2.00	2.00
Twine	4.80	3.42	4.44
Tractor ^d	3.87	3.31	4.13
Machinery ^d	2.54	2.15	2.69
Total	----- \$26.04	----- \$23.71	----- \$28.56
Labor (hours):^d			
Spring	5.8	4.6	6.5
Summer	2.6	2.2	2.0

^aHay yields were based on estimates by Dr. G. A. Jung and Dr. G. G. Pohlman, agronomists, West Virginia University. The estimates were for standing field yields adjusted to 88.0% dry matter or 12.0% moisture and were made taking into consideration soil characterization, climatic conditions, elevation, and other physical differentials.

^bPrice data used, other than for tractor and machinery operating expenses, are presented in Appendix Table 7, p. 85.

^cThe calcium, phosphorous, and potassium levels for each of the soils were based on weighted results of soil samples analyzed in the testing laboratories at West Virginia University; the data were provided by Dr. Carl Engle, agronomist, West Virginia University. Fertilization rates are based on **Fertilizer Recommen-**

dation Table for Field Crops, West Virginia University Agricultural Experiment Station and Cooperative Extension Service (Morgantown: West Virginia University, 1969).

^dTractor, machinery, and labor data were based on **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Table 6-14, pp. 22-31. Adjustments were made for local conditions and yields.

^eThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.02
Estimated Requirements and Production for Clover and Orchard Grass, Pope Soil, Study Area I,
Land Use Capability Class II, Bottomland^a

Item	Clover, only, first production year	Clover, only, second production year ^b	Orchard grass, annual production
Production per acre:			
Tons, hay	3.0	2.2	2.8
Expenses:			
Fertilizer	\$17.40	\$17.40	\$21.51
Lime	2.88	2.88	2.88
Twine	3.60	2.64	3.36
Tractor	3.46	2.95	3.45
Machinery	2.29	1.86	2.28
Total	\$29.63	\$27.73	\$33.48
Labor (hours):			
Spring	4.7	3.8	4.9
Summer	2.2	2.0	1.9

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard

grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.03

**Estimated Requirements and Production for Clover and Orchard Grass, Monongahela Soil, Study Area I,
Land Use Capability Class II, Upland^a**

Item	Clover, only, first production year	Clover, only, second production year ^b	Orchard grass, annual production
Production per acre:			
Tons, hay	2.7	2.0	2.6
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	2.38	2.38	2.38
Twine	3.24	2.40	3.12
Tractor	3.41	2.86	3.53
Machinery	2.13	1.61	2.21
Total	\$23.99	\$22.08	\$26.54
Labor (hours):			
Spring	4.4	3.6	5.1
Summer	2.2	1.9	1.8

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe orchard grass alternative was assumed to replace the "Clover, only second production year" alternative, if orchard

grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.04

Estimated Requirements and Production for Clover and Orchard Grass, Litz-Calvin Soils, Study Area I, Land Use Capability Classes III and IV, Upland^a

Item	Clover, only, first production year	Clover, only, second production year^d	Orchard grass, annual production
Production per acre:			
Tons, hay	2.5	1.9	2.4
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	2.50	2.50	2.50
Twine	3.00	2.28	2.88
Tractor	3.42 ^b	3.11 ^{b,e}	3.75 ^{b,e}
Machinery	2.20 ^b	1.97 ^{b,e}	2.33 ^{b,e}
Total	\$23.95 ^c	\$22.69 ^c	\$26.76 ^c
Labor (hours):			
Spring	4.6 ^{b,e}	3.8 ^{b,e}	5.3 ^{b,e}
Summer	2.3 ^{b,e}	2.1 ^{b,e}	1.9 ^{b,e}

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe estimates were for Class III land; therefore, tractor, machinery, and labor inputs were adjusted to reflect a ten per cent estimated increase above Classes I and II land. Tractor, machinery, and labor inputs were estimated to be twenty-five per cent greater for Class IV land than for Classes I and II land. Based on Paul E. Nesselroad, "Optimum Farm Organizations for a Portion of the Appalachian Plateau," (unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969), pp. 21-22.

^cOn Class IV land, total cost was estimated to be \$24.72, spring labor, 5.2 hours, and summer labor, 2.6 hours for the above "Clover, only, first production year" alternative. Second year clover, only cost was estimated to be \$23.39, 4.4 hours, and 2.4 hours, respectively. Orchard grass cost was estimated to be \$27.59, 6.0 hours, and 2.2 hours, respectively.

^dThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.05

Estimated Requirements and Production for Clover and Orchard Grass, Pope-Philo Soils, Study Area II, Land Use Capability Class I, Bottomland^a

Item	Clover, only, first production year	Clover, only, second production year ^b	Orchard grass, annual production
Production per acre:			
Tons, hay	4.0	2.5	3.0
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	3.00	3.00	3.00
Twine	4.80	3.00	3.60
Tractor	3.87	3.11	3.70
Machinery	2.54	2.00	2.32
Total	\$27.04	\$23.94	\$27.92
Labor (hours):			
Spring	5.8	4.2	5.5
Summer	2.6	2.1	1.9

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard

grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.06

**Estimated Requirements and Production for Clover and Orchard Grass, Atkins Soil, Study Area II,
Land Use Capability Class III, Bottomland^a**

Item	Clover, only, first production year	Clover, only, second production year ^c	Orchard grass, annual production
Production per acre:			
Tons, hay	2.5	1.5	2.2
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	3.75	3.75	3.75
Twine	3.00	1.80	2.64
Tractor	3.11 ^b	2.82 ^b	3.31 ^b
Machinery	2.00 ^b	1.64 ^b	2.03 ^b
Total	\$24.69	\$22.84	\$27.03
Labor (hours):			
Spring	4.2 ^b	3.2 ^b	4.6 ^b
Summer	2.1 ^b	1.6 ^b	1.6 ^b

^aSee footnotes a through d, Table 10.01, p. 61.

^bThough indicated as Class III land, no increases in tractor, machinery, and labor inputs due to slope were made for this particular soil as Atkins soil is nearly level (see footnote b, Table 10.04, p. 64).

^cThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.07

Estimated Requirements and Production for Clover and Orchard Grass, Monongahela Soil, Study Area II, Land Use Capability Class II, Upland^a

Item	Clover, only, first production year	Clover, only, second production year ^b	Orchard grass, annual production
Production per acre:			
Tons, hay	3.5	2.8	3.0
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	2.38	2.38	2.38
Twine	4.20	3.36	3.60
Tractor	3.60	3.38	3.63
Machinery	2.38	2.25	2.25
Total	\$25.39	\$24.20	\$27.16
Labor (hours):			
Spring	5.3	4.6	5.5
Summer	2.3	2.1	1.9

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard

grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.08

Estimated Requirements and Production for Clover and Orchard Grass, Dekalb-Lehew Soils, Study Area II, Land Use Capability Class III, Upland^a

Item	Clover, only, first production year	Clover, only, second production year ^c	Orchard grass, annual production
Production per acre:			
Tons, hay	3.3	2.7	2.8
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	2.58	2.58	2.58
Twine	3.96	3.24	3.36
Tractor	3.85 ^b	3.66 ^b	4.04 ^b
Machinery	2.54 ^b	2.41 ^b	2.56 ^b
Total	\$25.76	\$24.72	\$27.84
Labor (hours):			
Spring	5.5 ^b	4.9 ^b	5.8 ^b
Summer	2.6 ^b	2.3 ^b	2.1 ^b

^aSee footnotes a through d, Table 10.01, p. 61.

^bTractor, machinery, and labor requirements were increased ten per cent on Class III land (see footnote b, Table 10.04, p. 64).

^cThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.09
**Estimated Requirements and Production for Clover and Orchard Grass, Belmont Soil, Study Area II,
 Land Use Capability Class IV, Upland^a**

Item	Clover, only, first production year	Clover, only, second production year ^c	Orchard grass, annual production
Production per acre:			
Tons, hay	4.0	2.5	3.2
Expenses:			
Fertilizer	\$17.40	\$17.40	\$21.51
Lime	2.00	2.00	2.00
Twine	4.80	3.00	3.84
Tractor	4.86 ^b	3.13 ^b	4.50 ^b
Machinery	3.20 ^b	2.51 ^b	2.96 ^b
Total	\$32.26	\$28.04	\$34.81
Labor (hours):			
Spring	7.3 ^b	5.2 ^b	6.9 ^b
Summer	3.2 ^b	2.6 ^b	2.4 ^b

^aSee footnotes a through d, Table 10.01, p. 61.

^bTractor, machinery, and labor requirements were increased twenty-five per cent on Class IV land (see footnote b, Table 10.04, p. 64).

^cThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 10.10

Estimated Requirements and Production for Clover and Orchard Grass, Frankstown-Frederick-Pickaway Soils, Study Area III, Land Use Capability Classes II, III, and IV^a

Item	Clover, only, first production year	Clover, only, second production year ^c	Orchard grass, annual production
Production per acre:			
Tons, hay	4.5	2.75	4.0
Expenses:			
Fertilizer	\$12.83	\$12.83	\$15.30
Lime	1.88	1.88	1.88
Twine	5.40	3.30	4.80
Tractor	4.26	3.34	4.34
Machinery	2.94	2.20	2.86
Total	\$27.31 ^b	\$23.55 ^b	\$29.18 ^b
Labor (hours):			
Spring	6.6 ^b	4.4 ^b	6.9 ^b
Summer	2.7 ^b	2.2 ^b	2.1 ^b

^aSee footnotes a through d, Table 10.01, p. 61.

^bThe above budgets were for Class II lands. With requirements adjusted (see footnote b, Table 10.04, p. 64), on Class III land for "Clover, only, first production year," total costs were estimated to be \$28.03, spring labor, 7.2 hours, and summer labor, 3.0 hours, and for Class IV land, \$29.12, 8.2 hours, and 3.4 hours, respectively. "The Clover, only, second production year" alternative was estimated to have adjusted inputs for Class III land of \$24.10, 4.9 hours, and 2.4 hours, respectively, and for Class

IV land, \$24.94, 5.5 hours, and 2.7 hours, respectively. Likewise, the "Orchard grass, annual production" alternative was estimated to have inputs for Class III land of \$29.90, 7.6 hours, and 2.3 hours, respectively, and for Class IV land, \$30.29, 8.7 hours, and 2.6 hours, respectively.

^cThe orchard grass alternative was assumed to replace the "Clover, only, second production year" alternative, if orchard grass were included in the original small grain-clover seed mixture (see footnote f, Table 9.01, p. 49).

TABLE 11.01

Estimated Annual Requirement and Production for Maintaining or Improving Pasture, Three Treatment Levels, Upland Acid Soils, Study Areas I and II^a

Item	Treatment		
	Reseeded, fertilizer ^f and limed	Fertilized ^e and limed	Unimproved ^b
Carrying capacity per acre:			
Area I			
May-June, animal units	0.75	0.72	0.45
July-August-September, animal units	0.33	0.32	0.18
Area II			
May-June, animal units	1.14	1.10	0.54
July-August-September, animal units	0.47	0.45	0.27
Expenses:^b			
Seed	\$ 0.19	\$ —	\$ —
Fertilizer ^c	5.44	5.44	—
Lime ^c	1.50	1.50	—
Tractor ^d	0.54	0.51	—
Machine ^d	0.18	0.16	—
Fence ^e	0.54	0.54	0.54
Total	\$ 8.39	\$ 8.15	\$ 0.54
Labor (hours):^d			
Spring	0.3	0.2	—
Summer	0.7	0.7	0.2

(See next page for footnotes to Table 11.01)

(Footnotes for Table 11.01)

^aThe carrying capacity per acre for each of the pastures, seeding rates, mixtures, and seeding frequencies, plus fertilization and liming frequencies were based on estimates by Dr. G. G. Pohlman, agronomist, West Virginia University. The capabilities of the general pasture soils found in the study areas, rainfall, elevation, and other physical differentials were considered when making the estimates.

^bPrices used, other than tractor and machinery operating expenses, are presented in Appendix Table 7, p. 85.

^cLime, phosphorus and potassium requirements were based on the weighted results of 167 samples of Dekalb, Lehew, Litz, and Calvin soils analyzed in the testing laboratories at West Virginia University; the data were provided by Dr. Carl Engle, agronomist, West Virginia University. Fertilization rates are based on **Fertilization Recommendation Table for Field Crops**, West Virginia University Agricultural Experiment Station and Cooperative Extension Service (Morgantown: West Virginia University, 1969).

^dTractor, machinery, and labor data were based on **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (Universtiy Park: The Pennsylvania State University, 1965), Tables 6-14 pp. 22-31. These data were increased twenty-five per cent to reflect the greater requirements of operating on

the steeper pasture slopes existing in the study areas.

^ePasture fencing costs assumed the use of two strands of barbed wire over thirty-five inch woven-wire, the average acreage of cropland (131 acres) and pasture (412 acres) found on all study farms in Study Areas I and II, and pasture fields of 70.0 acres in size (see W. H. Pierre, et. al., **West Virginia Pastures: Type of Vegetation, Carrying Capacity, and Soil Properties**, West Virginia University Agricultural Experiment Station Bulletin 280 (Morgantown: West Virginia University, 1937), p. 8. The farmer was assumed to share the building of boundary fences with a neighbor. The procedure used for estimating fence costs was based on that discussed by Alfred L. Barr, **Beef Cattle Production: Cost and Returns for the Cow-Calf System in West Virginia**, West Virginia University Agricultural Experiment Station Bulletin 527 (Morgantown: West Virginia University, 1966), pp. 16, 17, and 19, and assumed a requirement of 6.15 miles of fence and a twenty-year fence life.

^fThese pastures were assumed to be reseeded every forty years, limed every ten years, topdressed with phosphorus and potassium every four years, and fertilized with nitrogen every five years. Clipping was assumed to be done annually.

^gThis pasture treatment was the same as that presented in footnote f, above, except that no reseeding was assumed.

^hNo improvements were assumed to be made on this pasture.

TABLE 11.02

Estimated Annual Requirements and Production for Maintaining and Improving Pasture, Three Treatment Levels, Bottomland Soils, Study Areas I and II^a

Item	Treatment		
	Reseeded, fertilized, and limed	Fertilized and limed	Unimproved
Carrying capacity per acre:			
May-June, animal units	1.25	1.20	0.70
July-August-September, animal units	0.56	0.54	0.35
Expenses:			
Seed	\$ 0.19	\$ —	\$ —
Fertilizer ^b	5.44	5.44	—
Lime ^b	1.65	1.65	—
Tractor ^c	0.43	0.41	—
Machine ^c	0.14	0.13	—
Fence	0.54	0.54	0.54
Total	\$ 8.39	\$ 8.17	\$ 0.54
Labor (hours):^e			
Spring	0.3	0.2	—
Summer	0.6	0.6	0.2

^aSee footnotes a, b, and e-h, Table 11.01, p. 72.

^bLime and fertilizer requirements were estimated using the procedure explained in footnote c, Table 11.01, p. 72, except Huntington, Lindside, Melvin, Pope, Philo, and Atkins soils were assumed.

^cSince the topography of these soils is nearly level, no adjustments were made in tractor, machinery, or labor inputs (see footnote d, Table 11.01, p. 72).

TABLE 11.03

Estimated Annual Requirements and Production for Maintaining and Improving Pasture, Three Treatment Levels, Upland Limestone Soils, Study Area III^a

Item	Treatment		
	Reseeded, fertilized, and limed	Fertilized and limed	Unimproved
Carrying capacity per acre:			
May-June, animal units	1.25	1.20	0.58
July-August-September, animal units	0.56	0.54	0.32
Expenses:			
Seed	\$ 0.19	\$ —	\$ —
Fertilizer ^b	5.44	5.44	—
Lime ^b	1.13	1.13	—
Tractor	0.54	0.51	—
Machinery	0.18	0.16	—
Fence ^c	0.58	0.58	0.58
Total	\$ 8.06	\$ 7.82	\$ 0.58
Labor (hours):			
Spring	0.3	0.2	—
Summer	0.7	0.7	0.2

^aSee footnotes a, b, d, and f-h, Table 11.01, p. 72.

^bLime and fertilizer requirements were estimated using the procedure explained in footnote c, Table 11.01, p. 72, except that Frankstown, Frederick, and Pickaway soils were assumed.

^cFencing costs were estimated using the sources, data, and procedure as explained in footnote e, Table 11.01, p. 72, except that 344 acres of pasture, 110.0 acres of cropland, and a field size of 40.0 acres were assumed.

TABLE 11.04

Estimated Annual Requirements and Production for Sudangrass Pasture on Selected Soils of the Three Study Areas^a

Item	Study Area I Soils				Study Area II Soils	
	Huntington	Pope	Monongahela	Litz-Calvin	Pope-Philo	Atkins
Carrying capacity per acre:						
July-August-September, animal units	2.6	1.9	1.8	1.7	2.0	1.5
Expenses:^b						
Seed	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50
Fertilizer	14.42	20.63	14.42	14.42	14.42	14.42
Lime	2.00	2.88	2.38	2.50	3.00	3.75
Tractor	2.23	2.01	2.23	2.45	2.23	2.23
Machinery	0.75	0.71	0.75	0.83	0.75	0.75
Total	\$21.90	\$28.73	\$22.28	\$22.70 ^{c,d}	\$22.90	\$23.65 ^e
Labor (hours):^b						
Spring	2.7	2.4	2.7	3.0 ^{c,d}	2.7 ^c	2.7
Summer	0.4	0.4	0.4	0.4 ^{c,d}	0.4 ^c	0.4

^aCarrying capacity per acre was estimated by Dr. G. A. Jung and Dr. G. G. Pohlman, agronomists, West Virginia University. Sudangrass was assumed to be planted in late May or June. Soil characteristics, climatic conditions, elevation, and other physical differentials were considered when estimating carrying capacity. Losses of twenty per cent due to livestock tramping and unpalatable stalks were deducted from the estimates.

^bSee footnotes b through e, Table 9.01, p. 49.

^cFor these budgets, tractor, machinery, and labor inputs

were assumed to be ten per cent higher on Class III land than on Classes I and II land (see footnote d, Table 9.04, p. 53).

^dClass IV Litz-Calvin soils were assumed to have the same carrying capacity per acre as Class III Litz-Calvin soils and to require \$23.15 total costs, 3.4 hours of spring labor, and 0.5 hours of summer labor with adjustments made for the increased slopes (see footnote c, above).

^eAtkins soil is Class III but nearly level; no increases were made in inputs required (see footnote c, above).

TABLE 11.04 (Continued)

Item	Study Area II Soils			Study Area III Soils
	Monongahela	Dekalb-Lehew	Belmont	Frankstown-Frederick-Pickaway
Carrying capacity per acre:				
July-August-September, animal units	2.0	1.9	2.2	2.7
Expenses:^b				
Seed	\$ 2.50	\$ 2.50	\$ 2.50	\$ 2.50
Fertilizer	14.42	14.42	20.63	14.42
Lime	2.38	2.58	2.00	1.88
Tractor	2.23	2.45	2.51	2.23
Machinery	0.75	0.83	0.89	0.75
Total	\$22.28	\$22.78 ^c	\$28.53 ^f	\$21.78 ^g
Labor (hours):^b				
Spring	2.7	3.0 ^e	3.0 ^f	2.7 ^g
Summer	0.4	0.4 ^e	0.5 ^f	0.4 ^g

^fTractor, machinery, and labor inputs were increased twenty-five per cent in the budget presented (see footnote c, above) for Class IV Belmont soil.

^gFrankstown-Frederick-Pickaway soils had estimated requirements of \$22.08 total costs, 3.0 hours of spring labor, and 0.4

hours of summer labor on Class III land and \$22.53 total costs, 3.4 hours of spring labor, and 0.5 hours of summer labor on Class IV land. Carrying capacity per acre was assumed to be the same on all land capability classes for these three soils.

References

1. **Agricultural Planning Data for the Northeastern United States.** Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51. University Park: The Pennsylvania State University, 1965.
2. Angus, R. C., and Barr, W. L. **Pennsylvania Farm Planning Handbook.** A.E. & R.S. Unnumbered Publication. University Park: The Pennsylvania State University, 1962.
3. Bacha, Joseph. Personal interview as graduate research assistant, Agricultural Economics, West Virginia University, September, 1969.
4. Barr, Alfred L. **Beef Management Systems contained in West Virginia University Animal Industry and Agronomy Field Day,** Department of Animal Science. Morgantown: West Virginia, 1968.
5. -----, **Beef Cattle Production: Cost and Returns for the Cow-Calf System in West Virginia.** West Virginia University Agricultural Experiment Station Bulletin 527. Morgantown: West Virginia University, 1966.
6. -----, Unpublished research, West Virginia University Agricultural Economics. Division of Resource Management. Morgantown: West Virginia University, 1969.
7. Barr, Alfred L., et al. **Biologic and Economic Aspects of Spring and Fall Breeding of Sheep.** West Virginia University Agricultural Experiment Station Bulletin 562. Morgantown: West Virginia University, 1968.
8. -----, **Resources, Production, and Income on Eastern West Virginia Beef Cattle Farms.** West Virginia University Agricultural Experiment Station Bulletin 546. Morgantown: West Virginia University, 1967.
9. -----, **Sheep Production: Cost and Returns in West Virginia.** West Virginia University Agricultural Experiment Station Bulletin 495. Morgantown: West Virginia University, 1966.
10. Barr, Alfred L. and Horvath, D. J. **Four Systems of Feeder Pig Production for West Virginia.** West Virginia University Cooperative Extension Service Miscellaneous Publication 154. Morgantown: West Virginia University, 1966.
11. **Compilation of Statistical Information, Annual Summary,** unnumbered publication. Bristol, Tennessee: Appalachian Milk Market Area Administration, 1968.
12. **Compilation of Statistical Material Pertinent to Federal Order No. 3: Washington, D. C. Market Area.** Annual Report. Alexandria: Federal Milk Marketing Administration, 1969.
13. **Complete Summary of Sales and Other Statistical Data: 1968.** DCSA No. 35. Pittsburgh: Dairymen's Co-operative Sales Association, 1969.
14. **Fertilizer Recommendations for Silage Corn and Field Corn.** West Virginia University Agricultural Experiment Station and Cooperative Extension Service, unnumbered publication. Morgantown: West Virginia University, 1969.
15. **Fertilizer Recommendation Table for Field Crops.** West Virginia University Agricultural Experiment Station and Cooperative Extension Service, unnumbered publication. Morgantown: West Virginia University, 1969.
16. **Field Worker's Blue Book: Livestock Program.** West Virginia University, Cooperative Extension Service, unnumbered publication. Morgantown: West Virginia University, 1967-68 and 1968-69.
17. Kline, Ralph G. **Economics of Adjustments for Small Flue-Cured Tobacco Farms: Southside, Virginia.** Virginia Polytechnic Institute Technical Bulletin 174. Blacksburg: Department of Agricultural Economics, 1964.

18. Lantz, Clifford G. **Report of Study of Property Valuations in West Virginia: Assessment Year, 1968.** A report prepared by the Office of the West Virginia Tax Commission. Charleston: Mathews Printing and Lithograph Company, 1968.
19. ----- **Thirty-Second Biennial Report: Tax Commission of West Virginia.** A report prepared by the Office of the West Virginia Tax Commissioner. Charleston: Mathews Printing and Lithograph Company, 1968.
20. Monongahela Power Company. Personal interview with Mr. Richard Owens, Personnel Director, Morgantown, West Virginia, November, 1968.
21. Morrison, Frank B. **Feeds and Feeding.** Ithaca: The Morrison Publishing Co., 1956.
22. Nationwide Insurance Company. Personal interview with Mrs. Homer C. Davis, Jr., agent, Morgantown, West Virginia, May, 1969.
23. Nesselroad, Paul E. "Optimum Farm Organizations for a Portion of the Appalachian Plateau." Unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1969.
24. Patton, Boyd J. **A Brief Description of the Major Soils of West Virginia.** USDA, SCS. Morgantown: West Virginia State Office, SCS, 1955.
25. Piere, W. H., et. al. **West Virginia Pastures: Types of Vegetation, Carrying Capacity, and Soil Properties.** West Virginia University Agricultural Experiment Station Bulletin 280. Morgantown: West Virginia University, 1937.
26. Porter, Clifford. **Field Crop Varieties for West Virginia.** West Virginia University Cooperative Extension Service, unnumbered publication. Morgantown: West Virginia University, 1969.
27. **Results: 1960-68 Spring Feeder-Calf Yearling Sales.** VPI Cooperative Extension Service, Department of Animal Industry in cooperation with the U. S. Department of Agriculture. Blacksburg: Virginia Polytechnic Institute, 1960-68.
28. Sheehy, Seamus. "Selection of Representative Benchmark Farms in Synthetic Supply Estimation." Unpublished Ph.D. dissertation, Department of Agricultural Economics and Rural Sociology, The Pennsylvania State University, 1964.
29. Spiker, Lynn. "Factors Influencing Price of Feeder Calves in West Virginia." Unpublished Master's thesis. College of Agriculture and Forestry, West Virginia University, 1967.
30. Southern States Cooperative, Inc. Personal interview with Mr. Max Alt, manager, Morgantown, West Virginia, May, 1969.
31. Toben, George E. Unpublished research, West Virginia University, Agricultural Economics Division of Resource Management. Morgantown: West Virginia University, 1969.
32. U. S. Department of Agriculture, Consumer Marketing Service. **Livestock Market News.** Vol. XXXVI, Nos. 6-9. Washington: U. S. Government Printing Office, 1968.
33. U.S. Department of Agriculture, Economic Research Service. **Livestock and Meat Situation.** Livestock Marketing Service No. 163. Washington: U. S. Government Printing Office, 1968.
34. ----- **Livestock and Meat Statistics.** Supplement to Statistical Bulletin No. 333. Washington: U.S. Government Printing Office, 1968.
35. U. S. Department of Agriculture, Soil Conservation Service. **Land Resource Map of West Virginia.** Beltsville: SCS, USDA, 1958.

36. ----- **Soil Survey: Monroe County: Berkeley County: Tucker County, West Virginia.** Washington: U. S. Government Printing Office, 1965, 1966, 1967.
37. **Waters, W. K. Cost and Returns Guide for Livestock Enterprises in Southwestern Pennsylvania.** Cooperative Extension Service, Farm Management No. 34. University Park: The Pennsylvania State University, 1966.
38. **West Virginia Agricultural Statistics: 1968.** West Virginia Crop Reporting Service, C. R. Bulletin No. 7. Charleston: West Virginia Department of Agriculture, 1968.
39. **West Virginia Market News.** Weekly livestock market report, Marketing Division, West Virginia Department of Agriculture. Charleston: West Virginia Department of Agriculture, 1960-68.

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APPENDIX

APPENDIX TABLE 1

Average Weights and Prices of Feeder Steers and Heifers Sold Through West Virginia Demonstrational Feeder Calf Sales, 1960-68

Year	Steers		Heifers	
	Weight	Price per hundredweight	Weight	Price per hundredweight
	Pounds	Dollars	Pounds	Dollars
1960	433	25.24	414	21.21
1961	436	27.26	408	22.71
1962	423	29.47	399	24.05
1963	430	26.27	402	22.11
1964	430	22.57	404	18.04
1965	427	26.04	402	20.77
1966	439	29.02	414	24.21
1967	457	29.58	422	24.63
1968	455	29.46	424	24.01
Average	437	27.21	410	22.41

Sources: Based on unpublished summaries for 1966-68 and **Field Worker's Blue Book—Livestock Program** (Morgantown: Cooperative Extension Service, West Virginia University, 1960-65).

APPENDIX TABLE 2

Average Steer Prices of Winchester Spring Feeder-Calf Yearlings and Moorefield Fall Feeder and Stocker Cattle, 1960-68

Year	Spring Steers	Fall Steers
	Price per hundredweight	Price per hundredweight
	Dollars	Dollars
1960	29.80	20.55
1961	27.84	22.85
1962	27.66	23.70
1963	28.21	21.73
1964	23.50	18.89
1965	26.54	22.97
1966	30.16	23.77
1967	27.11	24.40
1968	30.32	24.11
Average price	27.90	22.55
Average weight (pounds)	620	over 700

Sources: Spring prices were based on **Results: 1960-68 Spring Feeder-Calf Yearling Sales**, Cooperative Extension Service, Department of Animal Industry in cooperation with the U. S. Department of Agriculture (Blacksburg: Virginia Polytechnic Institute, 1960-68). Fall prices were for the South Branch Stockyard, Moorefield Fall Cattle Sales and weekly market sales taken from **West Virginia Market News**, Marketing Division, West Virginia Department of Agriculture. Vol. XII, Nos. 76, 78, 80, 83; 1960. Vol. XIII, No. 78; 1961. Vol. XIV, Nos. 76, 78, 80, 82; 1962. Vol. XV, No. 61; 1963. Vol. XVI, No. 45; 1964. Vol. XVII, No. 40; 1965. Vol. XVIII, Nos. 50, 52, 56; 1966. Vol. XIX, Nos. 61, 63, 65, 67; 1967. Vol. XX, Nos. 59, 61, 64, 66, 68; 1968. (Charleston: West Virginia Department of Agriculture, 1960-68).

APPENDIX TABLE 3

Lamb Crop, Mortality, Average Weight, and Market Grades of Lambs for Twenty Per Cent of Flocks with Highest Income in West Virginia Master Shepherd's Program, 1960-68^a

Year	Lamb mortality ^b	Lamb crop ^c	Lambs marketed or kept by grades ^d			Average weight of lamb marketed or kept
			Red	Blue	Lower	
		Per Cent				Pounds
1960	8.5	142	89	10	1	96
1961	7.1	166	82	16	2	88
1962	6.6	158	85	14	1	97
1963	4.7	158	95	5	0	101
1964	9.1	153	92	8	0	99
1965	10.0	161	97	2	1	99
1967	7.3	167	98	1	1	103
1968	9.4	169	97	3	0	96
Average	7.8	159	92	7	1	97

^aData for 1966 not available.

^bMortality data included lambs which died or were lost prior to attaining market weight.

^cLamb crop was determined as lambs attaining market weight.

^dBy comparison, Blue grade is equivalent to U. S. Prime and U. S. Choice, Red is U. S. Good, Medium is U. S. Utility, and Plain is U. S. Cull.

Sources: Data were based on records of 383 flocks totaling 19,514 breeding ewes for this eight-year period as taken from Alfred L. Barr, B. W. Wamsley, Jr., and Mary C. Templeton, **Sheep Production-Costs and Returns in West Virginia**, West Virginia University Agricultural Experiment Station Bulletin 495 (Morgantown: West Virginia University, 1966), pp. 6, 9, 10, 11; **Field Worker's Blue Book - Livestock Program** (Morgantown: Cooperative Extension Service, West Virginia University, 1967-68, 1968-69).

APPENDIX TABLE 4

Average Weight of Fleece, Price Per Pound, Income from Wool, Pounds of Lambs, Price Per Pound, and Income Received from Lambs, Per Breeding Ewe, for Twenty Per Cent of Flocks with Highest Gross Income Per Ewe in the West Virginia Master Shepherd's Program, 1960-68*

Pounds of wool per ewe	7.20
Wool price, dollars per hundredweight	56.80
Income from wool per ewe (dollars)	4.09
Pounds of lamb per ewe	152.00
Lamb price, dollars per hundredweight	22.30
Income from lambs per ewe (dollars)	33.90

*Data for 1966 not available.

Sources: Data were based on records of 383 flocks totalling 19,514 breeding ewes for this eight-year period as taken from Alfred L. Barr, B. W. Wamsley, Jr., and Mary C. Templeton, **Sheep Production — Costs and Returns in West Virginia**, West Virginia University Agricultural Experiment Station Bulletin 495 (Morgantown: West Virginia University, 1966), p. 14; **Field Worker's Blue Book — Livestock Program** (Morgantown: Cooperative Extension Service, West Virginia University, 1967-68, 1968-69).

APPENDIX TABLE 5

Incentive Payments Received by West Virginia Farmers for Shorn Wool and Unshorn Lambs, Marketed, 1960-68

Year	Wool incentive	Lamb incentive
	per pound	per hundredweight
	Cents	Dollars
1960	24.7	0.80
1961	24.0	0.76
1962	16.8	0.57
1963	15.6	0.54
1964	11.2	0.35
1965	19.6	0.60
1966	14.9	0.52
1967	30.3	1.05
1968	26.8	1.06
Average	20.4	0.69

Source: Dr. Alfred L. Barr, unpublished data (Morgantown: Agricultural Economics Division of Resource Management, West Virginia University, June 21, 1969).

APPENDIX TABLE 6

February and July Averages of Chicago Daily Quotations for U.S. No. 1 and 2 (200-220 Pounds) Barrows and Gilts, 1964-68^a

Year	February	July
	Price per hundredweight	Price per hundredweight
	Dollars	Dollars
1964	15.28	17.91
1965	17.92	24.72
1966	29.15	25.44
1967	20.30	23.84
1968	20.35	22.80
Average	20.60	22.94

^aBy using an "F-test" on variance and a "t-test" on means for average prices for all months of 1966, 1967, and 1968 the differences in prices between the Moorefield market and Chicago market were found to be non-significant at $p < 0.01$. Therefore, due to the availability of data, Chicago prices were used.

Sources: U. S. Department of Agriculture, Economic Research Service, **Livestock and Meat Statistics**, Supplement to Statistical Bulletin No. 333 (Washington: U. S. Government Printing Office, 1968), Table 203A, p. 140; U.S. Department of Agriculture, Economic Research Service, **Livestock and Meat Situation**, LMS No. 163 (Washington: U.S. Government Printing Office, 1968), p. 22; U. S. Department of Agriculture, Consumer Marketing Service, **Livestock Market News**, Vol. XXXVI, Nos. 6-9, (Washington: U. S. Government Printing Office, 1968), pp. 127, 151, 171, and 195.

APPENDIX TABLE 7

Prices Paid and Received by West Virginia Farmers for Item as Used Herein

Item	Unit	Price
Prices paid:		
Mineralized salt block	cwt.	\$ 3.30
Free choice mineral supplement	cwt.	5.00
Loose salt	cwt.	2.40
Thiabendazole	100 grams	5.09
Phenothiazine	lb.	1.20
Steamed bonemeal	cwt.	6.60
Atrazine	lb.	2.70
Fertilizer:		
10-10-10	ton	54.00
33-0-0	ton	59.00
0-15-30	ton	58.00
0-30-15	ton	68.00
5-20-10	ton	58.00
0-20-20	ton	57.00
5-20-20	ton	66.00
46% Phosphate	ton	72.00

APPENDIX TABLE 7 (Continued)

Item	Unit	Price
10-20-20	ton	74.00
60% Potash	ton	54.00
Seed:		
Clover, Alsike	lb.	0.36
Clover, Red	lb.	0.53
Orchard grass	lb.	0.40
Bluegrass, Kentucky	lb.	0.65
Sudan, Piper (hybrid)	lb.	0.13
Corn, grain or silage	bu.	13.25
Oats, spring	bu.	2.25
Wheat, winter	bu.	3.15
Barley, winter	bu.	2.65
Barbed wire (12 1/2 guage)	80 rods	7.95
Woven wire (35-inch)	20 rods	23.85
Staples	lb.	0.20
Feed:		
Milk replacer	cwt.	21.20
Dairy replacement feed	cwt.	4.90
Commercial hog supplement (38%)	cwt.	6.08
Pig prestarter	cwt.	4.95
Pig developer	cwt.	4.56
Sow feed (15%)	cwt.	3.87
Wheat bran	cwt.	3.49
Soybean oil meal (SBOM, 44%)	cwt.	5.01
Corn shelled	bu.	1.38
Oats	bu.	0.80
Clover hay, baled	ton	35.00
Clover-grass hay, baled	ton	32.00
Orchard grass hay, baled	ton	30.00
Straw	ton	20.00
Baling twine	bale	0.03
Lime, spread	ton	7.50
Fence posts	each	0.40
Fence braces	each	0.50
Farm gates	each	20.00
Electricity	kwh.	0.02
Livestock insurance	\$100, actual value	0.65
Prices Received:		
Corn, shelled	bu.	1.38
Oats	bu.	0.80
Wheat	bu.	1.73
Barley	bu.	1.07

APPENDIX TABLE 7 (Continued)

Item	Unit	Price
Clover hay, baled	ton	35.00
Clover-grass hay, baled	ton	32.00
Orchard grass hay, baled	ton	30.00
Straw	ton	20.00

Sources: Items through 15% sow feed were based on typical prices charged West Virginia farmers in 1969 as obtained from Mr. Max Alt, manager, Southern States Cooperative, Inc., Morgantown, West Virginia; the remaining feed, grain, and hay prices were based on **West Virginia Agricultural Statistics: 1968**, West Virginia Crop Reporting Service, C. R. Bulletin No. 7 (Charleston: West Virginia Department of Agriculture, 1968), pp. 42-45; baling twine and fencing item prices were based on A. L. Barr, **Beef Cattle Production: Costs and Returns for the Cow-Calf Systems in West Virginia**, West Virginia Agricultural Experiment Station Bulletin 527 (Morgantown: West Virginia University, 1966), Tables 2.5 and 5, pp. 12, 19. Lime price was based on unpublished data provided by Mr. George E. Toben, Agricultural Economist, West Virginia University; the electrical rate was based on existing rural rates in the Study Region as provided by Mr. Richard Owens, Monongahela Power Company, Morgantown, West Virginia; the livestock insurance rate was provided by Mrs. Homer C. Davis, Jr., Nationwide Insurance Co., Morgantown, West Virginia.

APPENDIX TABLE 8

Description of Machinery Assumed for Use in Crop Budgets and Estimated Hourly Operating Expenses

Machine	Description	Variable operating cost per hour
Tractor	3-plow (30-39 bhp.)	\$0.72
Plow	3-14"	0.35
Disc	8', tandem	0.19
Drag	10'	0.05
Cultivator	2-row	0.20
Planter	2-row	0.18
Drill	8'	0.36
Fertilizer Spreader	8'	0.15
Field Sprayer	20', boom	0.12
Mower	7'	0.26
Rake	7', side delivery	0.28
Conditioner		0.43
Baler	6', PTO, hand-load	0.78
Corn picker	2-row	0.97
Forage Blower		0.25
Wagon		0.15
Elevator		0.25
Forage Chopper	Direct cut	1.55
Combine	6', PTO	0.98

Sources: **Agricultural Planning Data for the Northeastern United States**, Department of Agricultural Economics and Rural Sociology, A.E. & R.S. 51 (University Park: The Pennsylvania State University, 1965), Tables 6-11 and 13-14, pp. 22-27 and 29-31.

APPENDIX TABLE 9

Description of Soil Series Estimated to Occur in Highest Incidence as Cropland on Study Farms in Each of the Three Study Areas

Soil(s)	Study Area(s) located	Land Use Capability Class(es)	Description
Huntington	I	I	Bottomland; derived from lime uplands; very high inherent fertility; deep; high moisture; well drained; moderate to rapid permeability; found with approximately level topography; and subject to overflow.
Pope	I	II	Bottomland; derived from gray acid shales and sandstones; moderate to high inherent fertility; deep; high moisture; well drained; moderately rapid permeability; found with approximately level topography; and subject to overflow.
Monongahela	I, II	II	Terraces; derived from acid uplands; low inherent fertility; moderately deep; moderate moisture; moderately well drained; slow permeability; found on 0-8 per cent slopes; found on terraces; and have fragipans.
Litz-Calvin	I	III, IV	Upland; derived from weakly alkaline or red acid shales; low to moderate inherent fertility; very shallow to shallow; very low to low moisture; well drained; moderate to rapid permeability; found on 10-30 per cent slopes; and are droughty.
Pope-Philo	II	I	Bottomland; derived from acid shales and sandstones; moderate to high inherent fertility; deep; moderate to high moisture; moderately well to imperfectly drained; slow to moderate permeability; found with approximately level topography; and subject to overflow.
Atkins	II	III	Bottomland; derived from acid uplands; low to moderate inherent fertility; deep; high moisture; poorly drained; very slow to slowly permeable; found with approximately level topography; and found in floodplains.
Dekalb-Lehew	II	III	Upland; derived from gray or red acid sandstones; low inherent fertility; shallow to moderately deep; low to moderate moisture; well drained; moderate to rapid permeability; found on 5-20 per cent slopes; and stony.

APPENDIX TABLE 9 (Continued)

Soil(s)	Study Area(s) located	Land Use Capability Class(es)	Description
Belmont	II	IV	Upland; derived from red and gray shales and interbedded limestones; high inherent fertility; moderately deep; moderate to moderately high moisture; well drained; moderate permeability; found on 20-30 per cent slopes on sink plateaus; and stony.
Frankstown- Frederick- Pickaway	III	II, III, IV	Upland; derived from impure limestones; moderate to high inherent fertility; deep; moderate to high moisture; moderately well to well drained; moderate permeability; found on 3-25 per cent slopes; and associated with upland plateaus.

Sources: U.S. Department of Agriculture, Soil Conservation Service, **Land Resource Map of West Virginia** (Beltsville: SCS, USDA, 1958); Boyd J. Patton, **A Brief Description of the Major Soils of West Virginia**, USDA, SCS (Morgantown: West Virginia State Office, SCS, 1955), pp. 1-4; and U. S. Department of Agriculture, Soil Conservation Service, **Soil Survey: Monroe County: Berkeley County: Tucker County, West Virginia** (Washington: U. S. Government Printing Office, 1965, 1966, 1967, respectively), pp. 113-14, 142-43, and 66, respectively.

APPENDIX TABLE 10

Assumed Animal Units Per Head of Livestock Used in Budgets for Pasture Requirements

Animal	Animal unit equivalent
Beef:	
Cow	1.00
Bull	1.00
Heifer (weaned to 1.0 years)	0.50
Heifer (1.0 - 1.5 years)	0.75
Bred heifer (1.5 years to calving)	1.00
Feeder	0.70
Calf ^a	0-0.40
Dairy:	
Cow	1.00
Replacement	0.70
Sheep:	
Ewe or ram	0.17
Lamb ^b	0-0.08
Hogs:	
Sow with 2.0 litters	0.20
Replacement gilt	0.15
Pigs to 220 pounds	0.05
Breeding boar	0.20

^aCalves were estimated to be 0.10 animal unit equivalent at 3.0 months and to increase 0.05 animal unit, consecutively, per month to 9.0 months of age.

^bLambs were estimated to be 0.02 animal unit equivalent at 3.0 months and to increase 0.01 animal unit, consecutively, per month to 9.0 months of age.

Sources: Based on estimates of scientists at West Virginia University Agricultural Experiment Station, and Alfred L. Barr, George E. Toben, and Charles C. Wilson, **Resources, Production, and Income on Eastern West Virginia Beef Cattle Farms**, West Virginia University Agricultural Experiment Station Bulletin 546, (Morgantown: West Virginia University, 1967), pp. 23 and 28.

APPENDIX TABLE 11

Assessed to Appraised Valuations and Tax Rates, Class I and Class II Properties, by Counties in Rural Districts of the Three Study Areas, Tax-Year, 1967-68

County	Ratio of assessed to appraised valuation		Rate of levy on assessed valuation
	Class I ^a	Class II ^a	Class I property
	Per cent ^b		Cents ^{b, c, d}
Hampshire	55	53	56
Hardy	64	55	53
Grant	51	53	65
Pendleton	51	56	55
Randolph	63	53	41
Pocohontas	72	50	38
Greenbrier	63	56	48
Monroe	59	52	44
Average	60	54	50

^aClass I property includes equipment, machinery, livestock, or any other personal property used for agricultural purposes; Class II property includes land, buildings, housing, etc., used in agricultural pursuits.

^bLevy rate for Class II property is, by law, twice that of Class I.

^cThe tax levy includes state current, county current, and county bond and school current and county school bond for tax-year, 1967-68.

^dProperty in West Virginia is taxed as to holdings on July 1.

Sources: Clifford G. Lantz, **Report of Study of Property Valuations in West Virginia: Assessment Year, 1968**, A Report prepared by the Office of the West Virginia Tax Commissioner (Charleston: Mathews Printing and Lithograph Company, 1968), pp. 12-14, 16, 31, 36, 38, and 42; Clifford G. Lantz, **Thirty-Second Biennial Report: Tax Commissioner of West Virginia**, A Report prepared by the Office of the West Virginia Tax Commissioner (Charleston: Mathews Printing and Lithograph Company, 1968), pp. 108, 114, 126, 138, 280, 318, 328, and 370.

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