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An Economic Evaluation of

Alternative Methods Of Beef Production

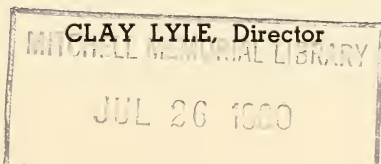
In The Prairie Area of Mississippi



Information on when to sell calves and how to manage them until sale is provided in this Experiment Station study.

MISSISSIPPI STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION

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An Economic Evaluation of Alternative Methods of Beef Production in the Prairie Area of Mississippi

By THOMAS E. TRAMEL, DONALD LEE MOTT,
and C. E. LINDLEY*

In recent years there has been a decided trend in Mississippi toward diverting land from cash crops to pasture and feed crops. This has been brought about by governmental restrictions on basic cash crops, improved technology in the livestock industry, and an increased demand for livestock and meat products. It seems quite likely that the trend will continue.

Cattle numbers in Mississippi have almost doubled in the last decade, with most of the increase being in beef cattle.

Forage from permanent pasture is a primary resource for beef cattle in Mississippi. There are several alternative systems or methods of beef production by which permanent pasture forage may be utilized (Appendix Tables 1, 2, and 3). Which of these methods is likely to return the greatest profits is an important question facing beef producers of the state. In addition, they face the problem of determining the best level of pasture improvement.

It was the purpose of this study to help answer these questions. Specifically, the objective was to determine the net returns per acre of permanent pasture which might be expected from alternative systems of beef production for two levels of pasture improvement.

Fourteen different methods of beef production were studied for each of two levels of pasture improvement. Each method was of the cow-calf type, relying upon a high quality breeding herd to raise all calves and replacement heifers; only bulls were purchased. Methods of production were classified on the following basis: (1) spring or fall calving, (2) age at which calves were marketed, (3)

type of winter ration, and (4) whether calves received concentrate feeding in addition to permanent pasture prior to marketing.

An annual budget, including grazing requirements for the entire herd, costs, and returns, was prepared for each of the 14 alternative methods for each of the two levels of pasture improvement.

The two levels of pasture improvement considered were (1) native pastures, and (2) pastures improved to the average level of all improved pastures found in a recent survey.¹ Carrying capacities per acre and annual pasture improvement costs were obtained from the survey just mentioned. To correspond to these pasture costs, prices for all other items were adjusted to the 1951-56 average. Costs included were: feed, permanent pasture costs, temporary winter pasture when needed for a particular system, labor, marketing, bull replacement, and miscellaneous.

Grazing available from permanent pastures, April to October, after harvesting the amount of hay needed was considered as the one factor limiting the size of the beef enterprise for each 100 acres.

Grazing available from permanent pasture in other months was considered as supplementary to the feeding program.

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¹Thomas E. Tramel, D. W. Parvin, and J. E. Betts, *Farm Pastures of the Prairie Area of Mississippi*, Mississippi Agricultural Experiment Station Bulletin 585.

Table 1. Summary of costs and returns per 100 acres of native open permanent pasture, 14 methods of handling cow-calf beef herds, Prairie Area Mississippi, 1956.

Item	Fall calves						Spring calves							
	Sold at weaning	Perm. pasture and feed	Perm. pasture and temp. winter pasture	Perm. pasture temp. winter pasture and perm. pasture	Sold at weaning	Roughed through winter and perm. pasture and feed	Roughed through winter and perm. pasture	Roughed through winter and perm. pasture	Roughed through winter and perm. pasture	Roughed through winter and perm. pasture	Roughed through winter and perm. pasture	Roughed through winter and perm. pasture and feed	Temp. winter pasture and perm. pasture	Temp. winter pasture and perm. pasture
Brood cows (No.)	25	24	23	21	25	20	19	14	15	20	20	18	25	23
Ages at which calves sold (mos.)	7.5	11.5	19.0	23.0	7.5	19.5	24.0	31.5	31.5	27.0	27.0	31.5	15.0	19.5
Weight of calves sold (lbs.)	450	700	750	1,000	350	800	750	900	1,000	900	1,000	1,075	700	850
Price per cwt. for calves (dol.)	20.18	23.81	20.70	23.85	16.56	23.07	18.40	19.96	23.85	20.67	23.85	23.85	20.70	23.76
Returns from calves, steers and heifers (dol.)	1,467	2,450	2,142	3,018	995	2,647	1,784	1,713	1,387	2,127	2,229	2,744	2,187	2,818
Returns from cull cows and cull bulls (dol.)	572	549	526	481	572	481	458	435	320	343	458	412	572	526
Total returns (dol.)	2,039	2,999	2,668	3,499	1,567	3,128	2,242	2,148	1,707	2,470	2,687	3,156	2,759	3,344
Feed costs (dol.)	948	1,582	873	1,590	599	1,355	642	824	604	1,201	643	1,245	598	1,303
Permanent pasture costs (dol.) ¹	81	81	81	81	81	81	81	81	81	81	81	81	81	81
Temporary winter pasture costs (dol.)	0	0	650	594	0	0	0	0	0	0	0	0	536	493
Labor costs (dol.)	171	186	193	202	181	227	212	235	190	209	233	229	207	216
Marketing costs (dol.)	75	103	93	116	61	105	79	75	59	82	92	106	97	113
Other costs (dol.)	211	210	206	196	213	194	184	181	138	149	191	178	221	211
Total costs (dol.)	1,486	2,162	2,096	2,779	1,135	1,962	1,198	1,396	1,072	1,722	1,841	2,380	1,740	2,417
Net returns per 100 ac. (dol.)	553	837	572	720	432	1,166	1,044	752	635	748	846	776	1,019	927

¹Includes only labor, power, equipment, and materials cost for land preparation, fertilization, and seeding.

Table 2. Summary of costs and returns per 100 acres of open permanent pasture improved to the average level of improvement for 1956, 14 methods of handling cow-calf beef herds, Prairie Area, Mississippi.

Item	Method of handling cow-calf beef herd													
	Fall calves					Spring calves								
	Sold at weaning	Perm. pasture and feed	Perm. pasture and temp. winter pasture	Perm. pasture temp. winter and feed	Sold at weaning	Roughed through winter and perm. pasture	Roughed through winter perm. pasture and roughed through winter	Roughed through winter perm. pasture and roughed through winter	Roughed through winter perm. pasture and roughed through winter	Roughed through winter perm. pasture and roughed through winter				
Brood cows (No.)	32	31	31	28	33	27	26	25	19	20	26	23	23	33
Age at which calves sold (mos.)	7.5	11.5	19.0	23.0	7.5	19.5	19.5	24.0	31.5	31.5	31.5	31.5	31.5	15.0
Weight of calves sold (lbs.)	475	725	800	1,050	375	950	850	800	1,000	1,100	950	1,150	1,150	725
Price per cwt. for calves (dol.)	20.18	24.33	22.07	25.42	16.56	24.63	21.94	22.15	22.28	25.41	22.07	25.41	25.41	22.07
Returns from calves, steers and heifers (dol.)	2,017	3,401	3,300	4,502	1,449	3,835	2,938	2,667	2,517	3,324	3,265	3,997	3,211	4,142
Returns from cull cows and cull bulls (dol.)	732	709	709	641	755	618	595	572	435	458	595	526	755	687
Total returns (dol.)	2,749	4,110	4,009	5,143	2,204	4,453	3,533	3,239	2,952	3,782	3,860	4,523	3,966	4,829
Feed costs (dol.)	1,188	2,016	1,160	2,101	775	1,723	818	1,064	809	1,585	820	1,574	772	1,684
Permanent pasture costs (dol.) ¹	344	344	344	344	344	344	344	344	344	344	344	344	344	344
Temporary winter pasture costs (dol.)	0	0	876	791	0	0	0	0	0	0	0	0	0	0
Labor costs (dol.)	219	240	260	269	239	291	276	310	258	279	302	293	273	282
Marketing costs (dol.)	101	141	138	170	85	149	120	111	99	124	130	148	137	162
Other costs (dol.)	270	271	278	261	281	249	239	238	188	199	249	227	292	275
Total costs (dol.)	2,122	3,012	3,056	3,936	1,724	2,756	1,797	2,067	1,698	2,531	2,626	3,277	2,525	3,390
Net returns per 100 ac. (dol.)	627	1,098	953	1,207	480	1,697	1,736	1,172	1,254	1,251	1,234	1,246	1,441	1,439
Net returns above native pastures per 100 acres (dol.)	74	261	381	487	48	531	692	420	619	503	388	470	422	512

¹Includes only labor, power, equipment, and materials cost for land preparation, fertilization, and seeding.

Temporary winter pasture, when needed for a particular system of production, was assumed to be planted in the ratio of two acres on permanent pasture sod to one on cropland.

Native Pastures

For this level of pasture improvement, selling spring calves at weaning results in lower net returns per 100 acres of pasture than any of the 14 alternative methods studied (Table 1).

The best alternatives appear to be: (1) roughing spring calves through the first winter and feeding out on permanent pasture the second summer, (2) roughing spring calves through the first winter and grazing permanent pasture the second summer, (3) grazing spring calves on temporary winter pasture the first winter and selling, or (4) grazing spring calves on temporary winter pasture the first winter and feeding out on permanent pasture prior to sale.

Net returns from the 14 alternative methods of production ranged from \$432 per 100 acres to \$1,166 per 100 acres.

Improved Pastures

Selling spring calves at weaning appears to be the least profitable of any of the 14 alternatives for this level of pasture improvement also (Table 2). Likewise, the same four alternatives as for

native pastures appear to be the best. Net returns per 100 acres ranged from \$480 to \$1,736.

Comparison of Net Returns for the Two Levels of Improvement

Difference in net returns per 100 acres depend upon the manner in which the grazing is utilized. For each of the 14 methods of beef production studied, the added cost of pasture improvement (\$263 annually per 100 acres) more than paid for itself. However, for both spring calves sold at weaning and fall calves sold at weaning, the rate of return was rather low, \$48 and \$74 per 100 acres, respectively. Net returns per 100 acres for the added cost of pasture improvement range up to \$692 for spring calves roughed through the first winter and grazed on permanent pasture the second summer.

Utilization of Grazing

The proportion of the total grazing used which is required for the brood herd and replacements appears to be one of the primary factors influencing profits from the beef enterprise. About 90 percent of the total grazing is required for the brood herd and replacements when calves are sold at weaning. In contrast, for the four most profitable alternatives the percentage ranged from 66 to 74.

Summary and Conclusions

Beef producers are faced with a choice of many alternative systems or methods of production, as well as the question of whether pasture improvement pays.

This study was made for the purpose of determining which of 14 methods of beef production of the cow-calf type that were considered feasible would likely be most profitable for two levels of pasture improvement. The two levels of improvement considered were (1) native pastures and (2) pastures improved to the average level of all pastures which were found to be improved in a recent survey of the Prairie Area of the state.

For both levels of pasture improvement, selling spring calves at weaning appeared to be the least profitable of any of the 14 alternatives considered. On the other hand, for both levels of pasture improvement, the best alternatives appeared to be:

(1) Roughing spring calves through the first winter and feeding out on permanent pasture the second summer,

(2) Roughing spring calves through the first winter and grazing permanent

pasture the second summer,

(3) Grazing spring calves on temporary winter pastures the first winter,

(4) Grazing spring calves on temporary winter pasture the first winter and feeding out on permanent pasture,

Net returns per 100 acres ranged from \$432 to \$1,166 for the native pastures and from \$480 to \$1,736 for the improved pastures.

Additional labor and additional investment in the beef herd is required for carrying calves beyond the weaning age. However, the added net returns would seem to be ample reward for doing so.

Net returns from pasture improvement depend upon the manner in which the forage is utilized. Net returns from pasture improvement would be only about \$48 and \$74 per 100 acres for spring calves sold at weaning and fall calves sold at weaning, respectively. On the other hand, net returns from the added \$263 per 100 acres annual improvement cost ranged up to \$692 for spring calves roughed through the first winter and grazed on permanent pasture the second summer.

Appendix Table 1. Alternative methods of beef production from a fall calving system.

Breeding Herd

Bulls: PP from Mar. 1 to Nov. 1^{1/}
 Fed from Nov. 1 to Mar. 1
 Hay 4,200 lbs.
 Corn 720 lbs.
 CSM 240 lbs.

Cows: PP from Mar. 15 to Nov. 15
 Fed from Nov. 15 to Mar. 15^{3/}
 Hay 1,000 lbs.
 Silage 4,500 lbs.
 Corn 200 lbs.
 CSM 200 lbs.

Calves - born November 1

① PP to June 15
 Sold at weaning, June 15

Grazed on PP
 Grazed on 1.00 ac. TW^{4/}

② Fed on PP and sold Oct. 15
 Fed from July 1 to Oct. 15
 Corn 1,500 lbs.
 CSM 165 lbs.

③ Sold from TW June 1

④ Fed on PP and sold Oct. 15
 Fed from June 1 to Oct. 15
 Corn 1,950 lbs.
 CSM 195 lbs.

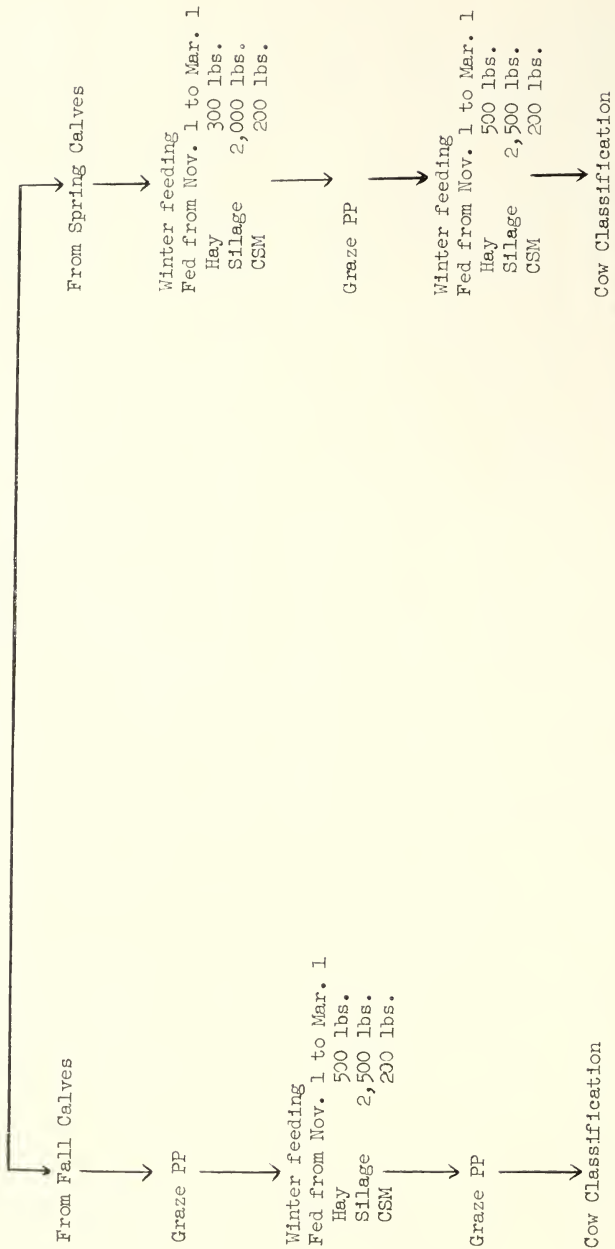
1/ PP denotes permanent pasture. 2/ CSM denotes cottonseed meal.

3/ Feed requirements for brood cows calving in the spring would be: Hay, 500 pounds; silage, 3,000 pounds; and cottonseed meal, 100 pounds.

4/ TW denotes oats for temporary winter pasture - the acreages listed refer to acres on cropland or its equivalent on sod-seeded permanent pasture.

Appendix Table 3. Method of raising replacement heifers from spring and fall calves.^{1/}

Replacement Heifers



^{1/} See footnotes to Appendix Table 1.