



The organization and structure of
by B Beattie

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE in Agricultural Economics
Montana State University
© Copyright by B Beattie (1964)

Abstract:

The purpose of this research study was to describe as completely as possible the organization and structure of the beef cattle industry in 18 counties of southeastern Montana. The description was accomplished by cross-classifying individual ranch data concerning nonbeef livestock enterprises, crop enterprises, the hay base, the pasture base, ranch size, and land tenure. Data concerning each of these items were stratified and then cross-classified with seven cow-herd-size-categories within each of four study areas. The number of observations, the mean, and the percentage distribution for each stratification were calculated and compared in order to identify unique populations of beef ranches within each area, cow-herd-size-group, and the beef industry of the entire study area.

The results of the study revealed that several unique populations of beef ranches exist within each of the study areas and that different output and input combination's are evident in different areas.

THE ORGANIZATION AND STRUCTURE
OF THE BEEF CATTLE INDUSTRY
IN SOUTHEASTERN MONTANA

by

Bruce R. Beattie

A thesis submitted to the Graduate Faculty in partial
fulfillment of the requirements for the degree


of

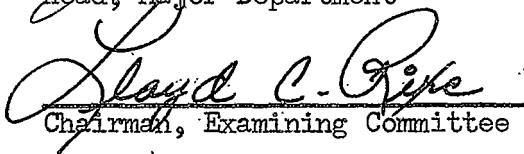
MASTER OF SCIENCE

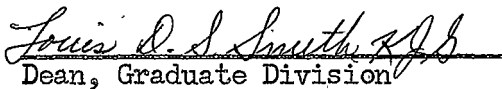
in

Agricultural Economics

Approved:


Head, Major Department


Chairman, Examining Committee


Dean, Graduate Division

MONTANA STATE COLLEGE
Bozeman, Montana

August, 1964

ACKNOWLEDGMENTS

The author wishes to express special thanks and appreciation to Dr. Lloyd C. Rixe, for his guidance and critical review of this thesis. Thanks are extended to Dr. Clarence W. Jensen and Mr. William J. Ewasiuk of the Department of Agricultural Economics who served on the thesis committee.

Appreciation is extended to W. D. Goodsel of the Farm Economics Research Division, Economic Research Service, and to Ray Hurley, Chief of the Agriculture Division of the Bureau of the Census for their cooperation in this study.

The author is indebted to John Miller and other members of the Computing Center at Montana State College, who spent many hours processing the data for this thesis.

Appreciation is also extended to the fellow graduate students who provided encouragement and helpful suggestions.

Any errors or omissions in this study are the responsibility of the author.

TABLE OF CONTENTS

	<u>Page</u>
VITA	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	xii
 <u>Chapter</u>	
I. INTRODUCTION	1
Problem Situation	1
Research Problem	7
Objectives	9
Limitations	9
II. PROCEDURE	10
The Study Area	11
Beef Cow Distribution	15
III. OTHER ENTERPRISES FOUND IN COMBINATION WITH BEEF CATTLE RANCHES	20
Livestock Enterprises	20
Sheep	20
Swine	24
Dairy	25
Crop Enterprises	27
All crops harvested	28
All wheat	31
Winter wheat	35
Spring wheat and durum	38
Feed grains--oats and barley	41
Oats	43
Barley	46
Corn	48
Other crops	50
Sugar beets	51

TABLE OF CONTENTS (Cont.)

<u>Chapter</u>	<u>Page</u>
IV. LAND RESOURCE USE AS AN INPUT OF BEEF CATTLE RANCHES . . .	52
Hay	53
All hay	53
Alfalfa	56
Clover, timothy and other grasses, small grains for hay, and other hay	58
Wild hay	61
Pasture	62
Acres pastured per animal unit	62
Cropland pastured	66
Irrigated pasture	67
Pasture as percent of total land	69
General Land Data	72
Ranch size	72
Ownership pattern	75
Irrigated cropland	79
V. SUMMARY AND CONCLUSIONS	81
Area 1	82
Area 2	84
Area 3	85
Area 4	86
Area Comparisons	87
Suggestions for Further Research	90
APPENDICES	91
APPENDIX A	92
APPENDIX B	95
APPENDIX C	105
APPENDIX D	109
APPENDIX E	113
LITERATURE CITED	116

LIST OF TABLES

<u>Table</u>		<u>Page</u>
I.	CASH RECEIPTS FROM MARKETING LIVESTOCK AND LIVESTOCK PRODUCTS (MONTANA)	2
II.	MAJOR USES OF LAND IN MONTANA, 1950	5
III.	BEEF COW NUMBER DISTRIBUTION BY STUDY AREA	16

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Cattle (except milk cows) and sheep on farms, Montana, 1925-60	4
2. Graphic distribution of study areas	13
3. Types of farming	14
4. Percentage distribution of cow number strata by area . . .	17
5. Percentage distribution of ranches having no breeding AU's of sheep per breeding AU of beef cow, by cow strata	22
6. Percentage distribution of ranches having 0 to 0.5 breeding AU's of sheep per breeding AU of beef cow, by cow strata . .	23
7. Percentage distribution of ranches having more than 0.5 breeding AU's of sheep per breeding AU of beef cow, by cow strata	23
8. Percentage distribution of ranches farrowing more than one litter of hogs, by cow strata	25
9. Percentage distribution of ranches having more than five dairy cows, by cow strata	27
10. Percentage distribution of ranches having zero acres in all crops, by cow strata	29
11. Percentage distribution of ranches having more than zero but not more than 50 acres of all crops, by cow strata . .	30
12. Percentage distribution of ranches having more than 50 but not more than 200 acres of all crops, by cow strata	30
13. Percentage distribution of ranches having more than 200 acres of all crops, by cow strata	31
14. Percentage distribution of ranches having no wheat, by cow strata	33
15. Percentage distribution of ranches having more than zero but not more than 50 acres of wheat, by cow strata	33

LIST OF FIGURES (Cont.)

<u>Figure</u>	<u>Page</u>
16. Percentage distribution of ranches having more than 50 but not more than 200 acres of wheat, by cow strata	34
17. Percentage distribution of ranches having more than 200 acres of wheat, by cow strata	34
18. Percentage distribution of ranches having no winter wheat, by cow strata	36
19. Percentage distribution of ranches having more than zero but not more than 50 acres of winter wheat, by cow strata .	36
20. Percentage distribution of ranches having more than 50 but not more than 200 acres of winter wheat, by cow strata . . .	37
21. Percentage distribution of ranches having more than 200 acres of winter wheat, by cow strata	37
22. Percentage distribution of ranches having no spring wheat or durum, by cow strata	39
23. Percentage distribution of ranches having more than zero but not more than 50 acres of spring wheat or durum, by cow strata	39
24. Percentage distribution of ranches having more than 50 but not more than 200 acres of spring wheat or durum, by cow strata	40
25. Percentage distribution of ranches having more than 200 acres of spring wheat or durum, by cow strata	40
26. Percentage distribution of ranches having no oats or barley, by cow strata	42
27. Percentage distribution of ranches having more than zero but not more than 50 acres of oats or barley, by cow strata	42
28. Percentage distribution of those ranches having more than 50 acres of oats or barley, by cow strata	43
29. Percentage distribution of ranches having no oats, by cow strata	44

LIST OF FIGURES (Cont.)

<u>Figure</u>		<u>Page</u>
30.	Percentage distribution of ranches having more than zero but not more than 50 acres of oats, by cow strata	45
31.	Percentage distribution of ranches having more than 50 acres of oats, by cow strata	45
32.	Percentage distribution of ranches having no barley, by cow strata	47
33.	Percentage distribution of ranches having more than zero but not more than 50 acres of barley, by cow strata	47
34.	Percentage distribution of ranches having more than 50 acres of barley, by cow strata	48
35.	Percentage distribution of ranches having corn, by cow strata	49
36.	Percentage distribution of ranches having other crops, by cow strata	50
37.	Percentage distribution of ranches having sugar beets, by cow strata	51
38.	Percentage distribution of those ranches having 50 acres or less of all hay, by cow strata	54
39.	Percentage distribution of those ranches having more than 50 but not more than 200 acres of all hay, by cow strata	55
40.	Percentage distribution of those ranches having more than 200 acres of all hay, by cow strata	55
41.	Percentage distribution of those ranches having less than or equal to 50 acres of alfalfa, by cow strata	57
42.	Percentage distribution of those ranches having more than 50 but not more than 200 acres of alfalfa, by cow strata	57
43.	Percentage distribution of those ranches having more than 200 acres of alfalfa, by cow strata	58

LIST OF FIGURES (Cont.)

<u>Figure</u>	<u>Page</u>
44. Percentage distribution of those ranches having less than or equal to 50 acres of clover, timothy and other grasses, small grains for hay, and other hay (excluding wild hay), by cow strata	59
45. Percentage distribution of those ranches having more than 50 but not more than 200 acres of clover, timothy and other grasses, small grains for hay, and other hay (excluding wild hay), by cow strata	60
46. Percentage distribution of those ranches having more than 200 acres of clover, timothy, and other grasses, small grains for hay, and other hay (excluding wild hay), by cow strata	60
47. Percentage distribution of those ranches having more than 10 acres of wild hay, by cow strata	62
48. Percentage distribution of those ranches having not more than 20 acres of land pastured per animal unit, by cow strata	64
49. Percentage distribution of those ranches having more than 20 but not more than 40 acres of land pastured per animal unit, by cow strata	64
50. Percentage distribution of those ranches having more than 40 but not more than 60 acres of land pastured per animal unit, by cow strata	65
51. Percentage distribution of those ranches having more than 60 acres of land pastured per animal unit, by cow strata	65
52. Percentage distribution of those ranches having cropland for pasture, by cow strata	67
53. Percentage distribution of those ranches having irrigated pasture, by cow strata	68
54. Percentage distribution of those ranches having pasture comprising less than 40 percent of total land, by cow strata	70

LIST OF FIGURES (Cont.)

<u>Figure</u>		<u>Page</u>
55.	Percentage distribution of those ranches having pasture comprising more than 40 percent but not more than 60 percent of total land, by cow strata	70
56.	Percentage distribution of those ranches having pasture comprising more than 60 percent but not more than 80 percent of total land, by cow strata	71
57.	Percentage distribution of those ranches having pasture comprising more than 80 percent of total land, by cow strata	71
58.	Percentage distribution of those ranches having total land of less than or equal to 640 acres, by cow strata	73
59.	Percentage distribution of those ranches having total land of more than 640 acres but not more than 2,560 acres, by cow strata	74
60.	Percentage distribution of those ranches having more than 2,560 acres but not more than 6,400 acres of total land, by cow strata	74
61.	Percentage distribution of those ranches having total land of more than 6,400 acres, by cow strata	75
62.	Percentage distribution of ranches where zero percent of the land is owned, by cow strata	77
63.	Percentage distribution of ranches where greater than zero but not more than 60 percent of the land is owned, by cow strata	77
64.	Percentage distribution of ranches where more than 60 but not more than 99 percent of the land is owned, by cow strata	78
65.	Percentage distribution of ranches where all of the land is owned, by cow strata	79
66.	Percentage distribution of those ranches having irrigated cropland, by cow strata	80

ABSTRACT

The purpose of this research study was to describe as completely as possible the organization and structure of the beef cattle industry in 18 counties of southeastern Montana.

The description was accomplished by cross-classifying individual ranch data concerning nonbeef livestock enterprises, crop enterprises, the hay base, the pasture base, ranch size, and land tenure. Data concerning each of these items were stratified and then cross-classified with seven cow-herd-size-categories within each of four study areas. The number of observations, the mean, and the percentage distribution for each stratification were calculated and compared in order to identify unique populations of beef ranches within each area, cow-herd-size-group, and the beef industry of the entire study area.

The results of the study revealed that several unique populations of beef ranches exist within each of the study areas and that different output and input combinations are evident in different areas.

CHAPTER I

INTRODUCTION

Problem Situation

The farming and ranching industry in Montana plays an important role in the income of the state. The beef industry as a particular segment of agriculture has been a very important economic force in the Montana economy since its early beginning. It was the first principle agricultural industry in the state and still remains an important industry to the Montana economy. This is largely due to the fact that the range forage resource, which is so abundant in Montana, is marketed principally through the beef cattle industry.

Agriculture as an industry contributes a greater proportion to the income of the state of Montana than does agriculture to the income of the nation as a whole. Montana derives 17.1 percent of its personal income directly from farming and ranching. Montana ranks fourth highest in the nation as far as percent of personal income derived from farming is concerned. North Dakota, South Dakota, and Iowa are the only states that derive a greater portion of their personal income directly from farming. Farming and ranching contributes only 4.3 percent to the personal income of the United States.¹

In the state of Montana the livestock industry contributes just about one half of the cash receipts of all farm products marketed. The 1962

¹Committee for Economic Development, An Adaptive Program for Agriculture, July, 1962, p. 66.

issue of Montana Agriculture Basic Facts states:

The value of livestock and livestock products marketed rose above the crop value in 1958 and 1959 but were below for the previous six years. Over the period from 1944 to 1959, livestock and livestock products brought in 5 percent less cash receipts than crops marketed.²

Table I shows the cash receipts from marketing livestock and livestock products as it is related to total receipts.

TABLE I. CASH RECEIPTS FROM MARKETINGS, LIVESTOCK AND LIVESTOCK PRODUCTS (MONTANA).*

	1955-1959 Averages				
	All Cash Sales	Average Value	Livestock and Products	1951-1955 Average Value	1955-59 as % of 1951-55
	%	\$	%	\$	%
Livestock & products	49.1	200,046	100.0	180,277	110.9
Cattle & calves	36.4	149,191	74.6	119,719	124.6
Dairy products	3.8	15,550	7.8	15,710	99.0
Sheep & lambs	3.3	13,477	6.7	15,690	85.9
Wool	1.6	6,357	3.2	10,762	59.1
Hogs	1.6	6,390	3.2	8,418	75.9
Eggs	1.4	5,786	2.9	9,108	77.1
Chickens		1,235	0.6		
Other	0.9	2,060	1.0	869	237.0

*Source: Cooperative Extension Service and Ag. Experiment Station, Montana Agriculture Basic Facts, #293, June, 1962, p. 19.

²Cooperative Extension Service and Ag. Experiment Station, Montana Agriculture Basic Facts, #293, June, 1962, p. 19.

During the period from 1955 to 1959, 49.1 percent or nearly one half of all cash sales were attributable to livestock and livestock products in Montana.

One would certainly not expect livestock to decline in importance relative to crops in Montana. Some important changes have taken place in the demand for farm products. As an economy experiences growth and becomes more affluent, the demand for meat and livestock products increases relative to cereal grains. If we assume that as an economy becomes more affluent, it shifts its consumption in the direction of goods with a higher income elasticity of demand, then we could safely say that the demand for meat and livestock products is going to increase relative to the demand for crops (thinking in terms of crops used primarily for human consumption). Therefore, one would not expect resources devoted to livestock production in Montana to be transferred to the production of food grains.

If we focus our attention once again on the data shown in Table I, we see that a significant portion of the cash receipts from Montana's livestock industry comes from cattle and calves. There is reason to believe that the percentage of all livestock receipts resulting from the sale of cattle and calves (beef industry) is likely to increase. In past years cattle numbers and sheep numbers in Montana have tended to follow different trends. Sheep numbered over 5 million head in the first decade of the 1900's, but there were only 1.75 million head on January 1, 1961.³ This reduction of sheep numbers by 65 percent was accompanied by approxi-

³Ibid., p. 19.

mately a 40 percent increase in cattle numbers over the same period. In the future, cattle numbers are likely to continue to increase and sheep and lambs to decrease. The relationship between beef cattle and sheep numbers over the period from 1925 to 1960 is shown in the following graph (Figure 1). Sheep have decreased almost steadily since 1942.

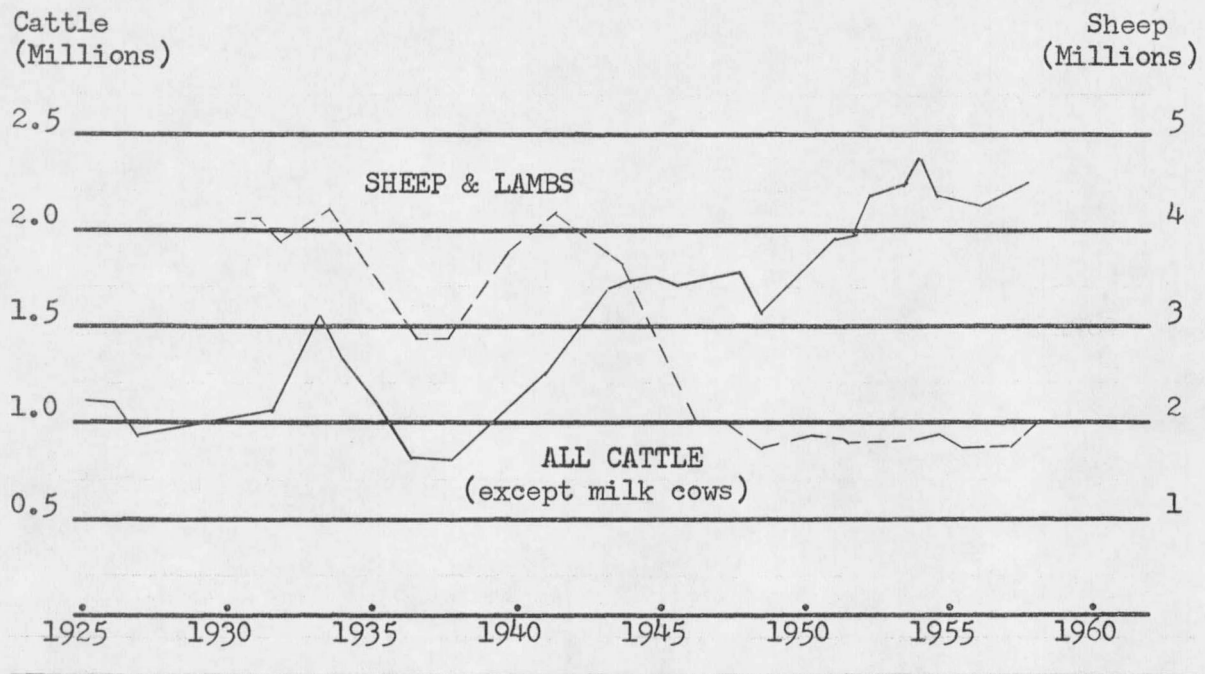


Figure 1. Cattle (except milk cows) and sheep on farms, Montana, 1925-60.*

*Source: Cooperative Extension Service and Ag. Experiment Station, Montana Agriculture Basic Facts, #293, June, 1962, p. 19.

Cattle and sheep ranching in Montana is still predominantly a range operation. Therefore, it is natural that as sheep numbers decrease, cattle numbers will increase. In 1950 two-thirds of Montana's land area was in pasture and range, or 63 million acres out of the total of 93.6

