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EC64-211 Your Cattle Ranch Business

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Your Cattle Ranch Business

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Your Cattle Ranch Business

by John F. Vallentine, Donald C. Clanton,
Donald F. Burzlaff and Paul Q. Guyer[1]

INTRODUCTION

The cattle producer must keep good records to improve his production efficiency. Only good records can tell him where he has been and where he is now. They identify problem areas in the ranch business and help in deciding what changes should be made.

ANALYZING THE RANCH BUSINESS

Pounds of Beef Produced Per Cow

Establish the unit of production before analyzing the ranching operation. The best measure of production from the cow herd on a cow-calf ranch is pounds of calf produced per cow. In a cow-yearling operation this unit is pounds of yearling produced per cow. However, on steer ranches or combination ranches the measure of production might be pounds of beef produced per animal unit.

Weaning weight is the average weight of all calves and is usually standardized at an average age of 200 days. Yearling weights are best standardized at 18 months of age. Percent calf crop is based on the number of calves weaned per 100 cows going into the winter that were exposed to bulls the preceeding breeding season.

Pounds of calf produced per cow in a cow-calf operation depend on two factors: (1) percent calf crop (at weaning) and (2) average weaning weight. To find the number of pounds of calf produced per cow in your cow-calf operation use Table 1. If your ranch sells yearlings rather than calves, use this formula instead of Table 1:

Lbs. of beef produced per cow
=
No. of yearlings produced per 100 cows ÷ 100
×
Average weight of yearlings at 18 mo.

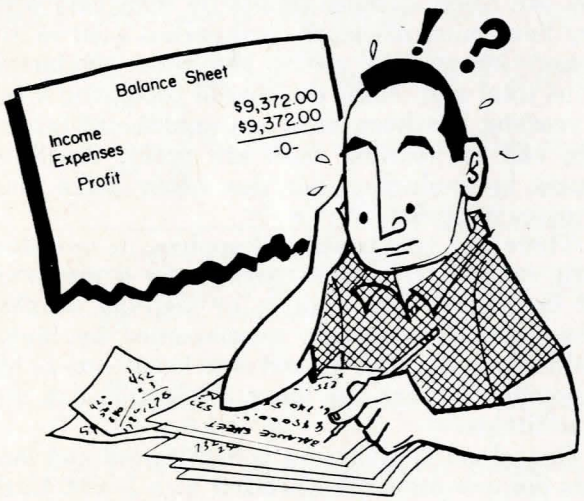


Table 1. Pounds of calf produced per cow at various weaning weights and calf crops.[a]

Percent calf crop	Average weaning weight in pounds						
	500	475	450	425	400	375	350
95	475	452	425	404	380	366	333
90	450	428	405	383	360	338	315
85	425	404	383	361	340	319	298
80	400	380	360	340	320	300	280
75	375	356	338	319	300	282	263
70	350	333	315	298	280	263	245

[a]This table was developed by multiplying average weaning weights by percent calf crop.

Annual Cost Per Cow

After finding the pounds of calf or yearling produced per cow, find the annual cost of carrying the cow (or cow plus yearling in a cow-yearling operation). This annual cost varies from ranch to ranch in Nebraska. Annual costs on a hay ranch where cattle are fed hay most of the winter differ from those on a cake-and-range ranch. Also, it costs about 1½ times as much to carry a cow and yearling as a cow alone. Figures on annual cost per cow (or cow plus yearling) in Table 2 are only guides, but they indicate cost items that should be considered. Substitute your own actual costs.

Even cattlemen who own their own rangeland may find it easier to use the lease value of land instead of actual land costs. Figures indicating land costs in Table 2 are equivalent to grass lease of $3.44 and $3.67 per animal unit month (A.U.M.)[2] on a hay ranch and a cake-and-range ranch respectively ($41 ÷ 12 and $44 ÷ 12). Most ranchers

[1]Extension Range Management Specialist, Associate Professor of Animal Science, Associate Professor of Range Management and Professor of Animal Science (Agricultural Extension), University of Nebraska College of Agriculture and Home Economics.

[2]An A.U.M. is the forage and/or hay necessary to maintain a 1000 lb. cow or its equivalent for one month.

Table 2. Annual cost per cow (or cow plus yearling).

	Cow-calf operation		Your Ranch Costs	Cow-yearling operation[a]	
	Hay ranch	Cake & range ranch		Hay ranch	Cake & range ranch
Taxes and interest on investment (land)[b]	$ 41	$ 44	———	$ 66	$ 68
Taxes and interest on investment (cow)[c]	12	12	———	13	13
Hay (labor and operating expense)[d]	8	....	———	12	....
Supplements	6	9	———	12	18
Death loss	2	2	———	4	4
Veterinary and medicine	1	1	———	2	2
Bull costs[e]	8	8	———	8	8
Labor	11	11	———	17	17
Depreciation on equipment and improvements	6	4	———	8	6
Cow depreciation[f]	11	11	———	11	11
Total	$106	$102	———	$153	$147

[a] Includes cost of carrying a cow plus .85 yearling (85% calf crop) for one year beyond weaning.
[b] Cow-calf (hay ranch): (12 acres × $40 @ 5.5%) + (3 acres × $90 @5.5%) = $41.25 ($3.44 per a.u.m.)
Cow-calf (cake & range): (20 acres × $40 @ 5.5%) = $44.00 ($3.67 per a.u.m.)
Cow-yearling (both): figure yearling during first winter at .5 A.U. and the following summer at .75 A.U. (about .65 A.U. average).
[c] Cow-calf: Average salvage value of cow $\frac{\$215 + \$135}{2}$ @ 6% interest plus $1.50 for taxes. (Value of heifers when added to cow herd and when culled at end of lifetime production, placed at $215 and $135 respectively).
Cow-yearling: Cow cost plus $1 tax for yearling.
[d] 1½ T per cow and ¾ per yearling @ $5.50 per T.
[e] $700 — $250 = $450 ÷ 30 cows for 3 years = $5. Add $3 for annual carrying costs ($90 ÷ 30).
[f] Cow depreciation = total depreciation per cow ÷ lifetime performance in years $\left(\frac{\$215 - \$135}{7} = \$11\right)$.

who run cake-and-range operations try to carry some hay into the winter to meet emergencies. However, this consideration was omitted from Table 2.

The annual cost of maintaining a cow in a cake-and-range operation is about $62 when interest on land is excluded ($102 minus $40 = $62). Very few ranchers are able to obtain a 5% return on their land investment based on current land prices.

Figuring Profit Per Cow

The annual cost of maintaining a cow can be considered in terms of pounds of liveweight production. Table 3 shows the number of pounds of liveweight production per cow required to pay annual costs at various selling prices.

Using production figures of 90 percent calf crop and 425-pound calves, Table 1 shows 383 pounds of calf produced per cow. When annual costs per cow are $90 and calves are selling for 26¢ per pound, Table 3 shows that 346 pounds of calf are required to pay the costs of each cow. Table 4, using these production and cost figures, shows a profit of 37 pounds of calf or $9.62 per cow.

Table 3. Pounds of production per cow necessary to pay cost of producing a calf or yearling.[a]

Annual cost per cow	Average selling price per lb., liveweight								
	18¢	20¢	22¢	24¢	26¢	28¢	30¢	32¢	34¢
Cow-Yearling Operation									
$170	944	850	773	708	654	607	567	531	500
160	889	800	727	667	615	572	533	500	471
150	833	750	682	625	577	536	500	469	441
140	778	700	637	583	538	500	467	438	412
130	722	650	591	542	500	464	433	406	382
Cow-Calf Operation									
120	667	600	546	500	462	429	400	375	353
110	611	550	500	458	423	393	367	344	324
100	556	500	455	417	385	357	333	313	294
90	500	450	409	375	346	322	300	282	265
80	444	400	364	333	308	286	267	250	235
70	389	350	318	292	269	250	233	219	206

[a] This table was developed by dividing annual costs per cow by average selling price.

Table 4. Figuring profit per cow in pounds of calf and dollars.

	Pounds
Production:	
425 lb. calves with 90% calf crop (See Table 1)	383
Costs:	
$90 per cow, calves selling for 26¢ per lb. (See Table 3)	346
Profit:	
Pounds of calf	37
Dollars at 26¢ per lb.	$9.62

Increasing Efficiency of Operation

Ranchers wishing to increase profits often think in terms of more land and more cattle. In reality, they can often increase profits by managing what they have more efficiently and realize a 50 to 100 percent increase in profit, i.e., total production minus total cost. After the cost of producing a calf or yearling has been met, any additional returns from calf or yearling sales are profit. Small increases in production per cow often make large increases in profit.

There are two basic philosophies in operating cattle ranches. One is to manage for a maximum calf crop and high weaning or yearling weights. This approach is usually accompanied by higher production costs. The second is to keep costs as low as possible so that the lower production can still be profitable.

Rangeland in Nebraska is high priced and land costs per cow are fixed at rather high levels. Little

can be done to reduce taxes and interest on investment. Thus, most producers can make greater profit by increasing production than by reducing costs. Much can be done on most ranches to improve percent calf crop, increase weaning weight and quality of calves, and increase production from range and pasture.

A rancher still must analyze his cost situation. The most likely area to cut costs without impairing production is in machinery and labor. This is of most concern to the rancher with a large haying operation. Many ranchers graze livestock on subirrigated and dry valley meadows during the summer on a 2 or 3 year rotation basis, thereby reducing costs. Hill pastures are proving effective for winter grazing cow herds when properly supplemented.

Some ranchers may buy unnecessary concentrate supplements. However, net returns on most ranches can be increased more by improving the supplementation program than by spending less money for supplements. Careful evaluation may show that the wrong kind of supplement is being fed or that the supplements may be more effective if fed to different classes of livestock or at different dates during the winter.

Tables 5 through 9 show the importance of increasing production and/or lowering costs. In the first three examples (Tables 5, 6, and 7) production was increased with no increase in costs.

Increases of 5 percent in calf crop or 25 pounds in weaning weight can often be obtained by changes in herd management practices that will not increase costs. Having all calves from a cow herd born in one season or altering pasture or range management to provide more green grass during the nursing period can increase production with little additional expense.

Increasing production levels may increase costs but still increase net profit (Table 8). Opportunities to increase net profit by cutting costs alone will be less frequent on most ranches (Table 9).

Table 5. Increase % Calf Crop

Assume: annual cost of \$100 and 30¢ calves = 333 lbs. per cow to break even.

A. 80% calf crop at 425 lbs. = 340 lbs. per cow.
Then 7 lbs. (340 — 333) × 30¢ = \$2.10 profit per cow.

B. 90% calf crop at 425 lbs. = 383 lbs. per cow.
Then 50 lbs. (383 — 333) × 30¢ = \$15.00 profit per cow.

RESULT: an extra 10% calf crop increased profit by \$12.90 per cow.

Table 6. Increase Weaning Weights

Assume: annual cost of \$100 and 30¢ calves = 333 lbs. per cow to break even.

A. 400 lb. calves and 85% calf crop = 340 lbs. per cow.
Then 7 lbs. (340 — 333) × 30¢ = \$2.10 profit per cow.

B. 425 lb. calves and 85% calf crop = 361 lbs. per cow.
Then 28 lbs. (361 — 333) × 30¢ = \$8.40 profit per cow.

RESULT: 25 more pounds at weaning weight increased profit by \$6.30 per cow.

Table 7. Increase Quality (and Sale Price)

Assume: 85% calf crop and 425 lb. calves = 361 lbs. produced per cow.

A. \$100 per cow and 28¢ calves = 357 lbs. per cow to pay cost.
Then 4 lbs. (361 — 357) × 28¢ = \$1.12 per cow.

B. \$100 per cow and 30¢ calves = 333 lbs. per cow to pay cost.
Then 28 lbs. (361 — 333) × 30¢ = \$8.40 profit per cow.

RESULT: improving quality (and sale price) increased profit by \$7.28 per cow.

Table 8. Increase Both Cost and Production

A. Annual cost of \$90 and 30¢ calves = 300 lbs. per cow to break even, and 400 lb. calves and 85% calf crop = 340 lbs. per cow.
Then 40 lbs. (340 — 300) × 30¢ = \$12.00 profit per cow.

B. Annual cost of \$100 and 30¢ calves = 333 lbs. per cow to break even, and 425 lb. calves and 90% calf crop = 383 lbs. per cow.
Then 50 lbs. (383 — 333) × 30¢ = \$15.00 profit per cow.

RESULT: increasing both cost and production increased profit by \$3.00 per cow.

Table 9. Cut Costs

Assume: 425 lb. calves with 85% calf crop = 361 lbs. produced per cow.

A. \$100 per cow and 30¢ calves = 333 lbs. per cow to break even.
Then 28 lbs. (361 — 333) × 30¢ = \$8.40 profit per cow.

B. \$90 per cow and 30¢ calves = 300 lbs. per cow to break even.
Then 61 lbs. (361 — 300) × 30¢ = \$18.30 profit per cow.

RESULT: cutting costs increased profit by \$9.90 per cow.

IMPROVE YOUR PRODUCTION

Compare your profit factors with other cattlemen in your area who have a similar type of cattle, range or pasture, and system of production. If your ranch is below average in percent calf crop, weaning or yearling weights, or selling price per cwt., find what is keeping these production factors down.

If possible, make the changes to correct the

problem. Even if production on your ranch is average or above, there are practices that might further improve your level of production. Most cattle ranches in Nebraska can produce at least a 90% calf crop and weaning weights of 450 pounds or yearling weights (18 months) of 800 pounds.

Percent Calf Crop

The importance of increasing percent calf crop at various weaning weights and selling prices is shown in Table 10.

Table 10. Increased annual income per cow for each 5% increase in calf crop.[a]

Av. weaning weight (lbs.)	Sale Price (¢ per lb.)			
	20¢	24¢	28¢	32¢
500	$5.00	$6.00	$7.00	$8.00
450	4.50	5.40	6.30	7.20
400	4.00	4.80	5.60	6.40
350	3.50	4.20	4.90	5.60
300	3.00	3.60	4.20	4.80

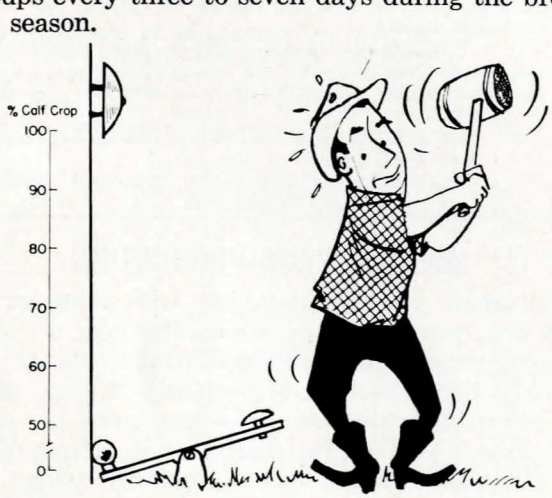
[a]This table was developed by multiplying the number of extra calves per 100 cows (5) by the average weaning weight by the selling price per pound and dividing by 100.

Steps To Increase Percent Calf Crop:

1. **Use enough bulls** to get cows settled promptly. Up to 4 or even 5 bulls may be needed per 100 cows on large range units. Breeding pastures for each bull and his harem of cows are most desirable from the standpoint of both sound range management and efficient breeding. When breeding pastures are used, a bull may serve up to 50 cows.

2. **Use fertile bulls.** An accurate way to measure bull fertility is to check their ability to settle cows before the regular breeding season. This can be done by mating new bulls to cull heifers and testing heifers for pregnancy 34 to 45 days after breeding. One may also collect and evaluate semen samples.

3. **Use bulls effectively** so that all cows coming into heat will be serviced. Spread bulls over the range twice or more weekly during the breeding season. Another effective practice is to divide the bulls into two groups, one with the cows and the other in a holding pasture. Alternate these two groups every three to seven days during the breeding season.



4. **Provide adequate nutrition prior to calving.**[3] Cows suckling calves, particularly 2- and 3-year-olds, may have long intervals between calving and first heat when quality or quantity of feed is inadequate prior to calving. This will lower percent calf crop because the cows will not cycle soon enough to breed back in the regular breeding season.

5. **Provide adequate nutrition following calving.** Cows suckling calves may have low conception rates when quantity and quality of feed are not adequate following calving and during breeding. Consider both supplementation and early, cool season grass pastures. Energy levels before calving greatly affect the interval from calving to first heat and proper energy levels after calving are necessary for high conception rates.

Table 11. Heavy stocking reduces percent calf crop.

	Rate of Stocking		
	Heavy	Medium	Light
Miles City, Montana			
Acres per cow	23	31	39
% calf crop weaned	70	89	90
Woodward, Oklahoma			
Acres per cow	12	17	22
% calf crop weaned	81	92	89

6. **Stock range at proper rates.** As shown in Table 11, long term studies show that heavy grazing reduces percent calf crop by 10 to 20% by preventing proper cow nutrition.

7. **Cull sterile cows or shy breeders.** Some cows have structural or hormonal abnormalities preventing conception or causing shy breeding. Except for very valuable cows, sell for slaughter those that do not conceive in a 60 to 90 day breeding season. If you have been experiencing low conception rates (below 80%), it may pay to pregnancy test the cow herd and cull open cows before winter.

8. **Control diseases that affect reproduction.** Diseases that can reduce percent calf crop include brucellosis, leptospirosis, vibro fetus, and trichomoniasis. A program of calfhood vaccination of replacement heifers will prevent brucellosis. Leptospirosis can be controlled through an annual vaccination program. If reproductive diseases are suspected in the cow herd call a veterinarian to prescribe any needed treatments.

Weaning Weights

Table 12 shows the increased income per cow resulting from increases in weaning weights at different selling prices.

Steps To Increase Weaning or Yearling Weights

1. **Feed supplements** required to balance nutrient deficiencies in range forage. This is necessary if cows are to give birth to normal, healthy calves, to milk well until new grass, and to rebreed for

[3]For more information on range feeding and nutrition write the Department of Animal Science, University of Nebraska College of Agriculture and Home Economics.

Table 12. Increased annual income per cow from increases in average weaning weight.[a]

Weight Increase lb.	Av. selling price per lb., liveweight			
	20¢	24¢	28¢	32¢
10	$ 2.00	$ 2.40	$ 2.80	$ 3.20
20	4.00	4.80	5.60	6.40
30	6.00	7.20	8.40	9.60
40	8.00	9.60	11.20	12.80
50	10.00	12.00	14.00	16.00
60	12.00	14.40	16.80	19.20

[a]This table was developed by multiplying the increase in weaning weight by the selling price per pound.

early calves next year. This requires adequate but not excessive supplementation of range forage with protein, energy, vitamin A, and mineral supplements beginning about three months before calving and lasting until green grass is available.

Supplements other than salt will not be needed on early summer range except during drought periods. Energy and protein concentrate supplements fed during summer drought should go to the calf rather than the cow. Always provide adequate supplies of clean, fresh water.

2. **Stock range at proper rates.** Because the nutritive requirement of a lactating cow is twice as great as that of a pregnant cow, plenty of forage must be available during lactation for cows to milk well and calves to gain rapidly. Heavy stocking over a period of several years commonly reduces weaning weights and yearling gains from 50 to 75 pounds. (Table 13).

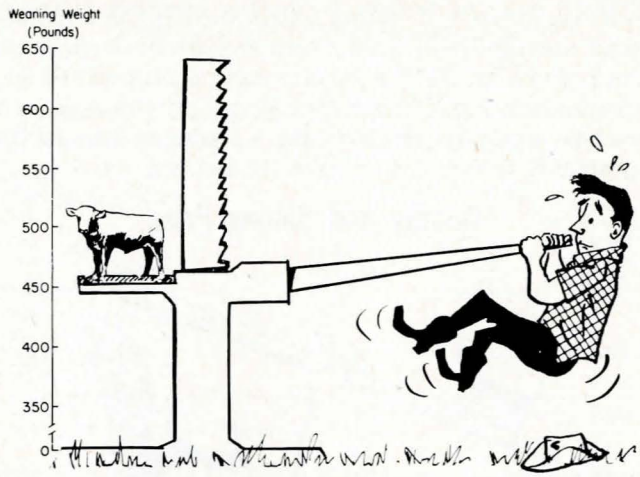
Table 13. Heavy stocking rates reduce weaning weights and yearling gains.

	Rates of stocking		
	Heavy[a]	Moderate	Light
Woodward, Oklahoma			
Acres per cow yearlong	12	17	22
Calf weaning weights (lbs.)	404	481	512
Miles City, Montana			
Acres per cow yearlong	23	31	39
Calf weaning weights (lbs.)	372	422	439
Ft. Hays, Kansas			
Acres per yearling steer (May 1 to Nov. 1)	2.0	3.4	5.0
Summer gain per head (lbs.)	122	188	217

[a]Overstocking sharply reduces the daily intake of forage by grazing animals by forcing them to eat the stemmy, less nutritious plant parts. It also reduces the vigor and productivity of forage plants.

3. **Improve poor condition range.** Seeding poor condition range, spraying weedy range, or fertilizing subirrigated meadows or cool season grass pastures will improve production and quality of forage, and increase weaning and yearling weights.

4. **Selecting and culling breeding stock.** When range forage and cattle management conditions are good and weaning weights are still low, poor milk production and slow growth may have been bred into the cow herd. Production records will increase the herd average if used in (1) selecting high producing replacement heifers, (2) selecting bulls



capable of transmitting high production, and (3) culling cows and bulls producing offspring with low production records. Both milk production and growth ability are highly inherited.

5. **Change calving time to produce heavier calves.** It is ideal to schedule calving time so most of the calves are 1 to 2 months old when pastures are ready for grazing in the spring. Calves then can make better use of the rapid increase in milk production and make maximum gains from the green forage before weaning. However, this earlier calving in the spring may also cost more because of extra hay or supplements or equipment needed or because of increased death loss of calves. Fall calving may be followed provided an ample supply of high quality roughage is available through the winter.

6. **Creep feed calves.** Creep feeding under normal conditions will often increase weaning weights by 50 pounds but may not be economical. Gains from creep feeding are not efficient and it appears that creep fed calves must sell for a higher price to be profitable. Cow weights are not affected by creep feeding. Creep feeding is not necessary for developing replacement heifers. Greatest returns from creep feeding can be expected:

(1) When calves are out of first calf heifers, particularly two-year olds.

(2) When calves are out of old cows past their peak milk production.

(3) During drought years, or on low quality pasture where good forage is scarce enough to cause cows to milk poorly. Creep feeding should not be a substitute for good range management.

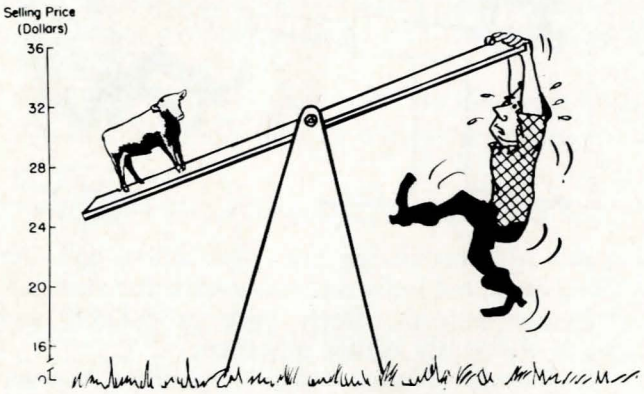
(4) When calves are to be slaughtered within three months after weaning; this is a special system of production.

7. **Late summer protein supplementation of yearlings** on grass. This shows promise, particularly in drought years. One pound of 34% protein supplement daily has increased daily gains of yearling steers at the Scotts Bluff Experimental Range by .24 to .45 pounds from July 15 to September 15.

8. **Control parasites and diseases.** Flies of

various types will bother cattle during the summer and are likely to hold down gains. Back rubbers and spraying are the more common procedures for controlling flies. Other parasites and diseases can reduce weaning weights and a manager should be prepared to act if a disease breaks out.

Quality and Selling Price



The selling price required to break even is determined by the cost of producing a calf, the percent calf crop, and the selling weights. These relationships for a cow-calf operation are shown in Table 14.

Table 14. Necessary selling price of calves to break even with a $100 annual cost per cow.[a]

% Calf Crop	Average selling weight of calves		
	350 lbs.	400 lbs.	450 lbs.
	(¢ per lb.)	(¢ per lb.)	(¢ per lb.)
95	30.1	26.3	23.4
90	31.7	27.8	24.7
85	33.6	29.4	26.1
80	35.7	31.3	27.8
75	38.1	33.3	29.6

[a]This table was developed by dividing the annual cost per cow by the average pounds of calf sold per cow (% calf crop × average selling weights per calf).

Steps to Increase Sale Value by Increasing Quality

1. Select bulls and replacement heifers that have both good conformation and weight for age.
2. Sell calves and yearlings in groups uniform in sex, age, size, and grade. Shortening the calving season increases uniformity.
3. Have proper but not excessive finish for the market for which you are preparing.
4. Sell at markets where feeder buyers are competitive. Market small groups of feeder calves at feeder calf sales when possible.
5. Dehorn all feeder calves and castrate male feeder calves.
6. Do not offer for sale calves or yearlings with unusual fill.

RANCH ORGANIZATION

Several alternative organizations are possible on Nebraska ranches. Ranchers should use their land, labor, capital, and management to best advantage to get maximum returns.

The principal types of cattle ranches are the cow-calf ranch, the cow-yearling ranch, and the steer ranch. Production of feeder steers beyond long yearling age is not common. Production of commercial cattle or registered breeding stock is a further alternative. Consider also spring calving, or fall calving, or a combination of spring and fall calving in split cow herds. Combinations of any of the above systems are possible.

There is no one best organization for all ranches in Nebraska. Each type of ranch has been operated successfully by Nebraska ranchers. However, the demand for lighter, younger cattle has resulted in a trend away from the production of two-and-three-year-old feeder steers. The manager must choose the organization that will provide maximum earnings on his particular ranch.

Ranch Organization Considerations

1. An interest in caring for the herd during calving season and a willingness to work at night and in stormy weather when necessary is needed in a cow-calf or cow-yearling system.
2. An excellent judgment of quality, condition, and current value of feeders and good buying ability favors a steer operation.
3. Ability to manage a breeding herd to get a high percent calf crop and high weaning weights is essential in cow-calf or cow-yearling operations.
4. Willingness to give good care to weaner calves during the winter is important on a steer ranch where success depends on getting economical gains.
5. The highest market risk occurs in a steer ranch operation where success depends greatly on buying the calves right and on a favorable market the following fall.
6. A steer ranch needs good winter feed for wintering weaner calves. A cow herd can use winter range or low quality roughage better.
7. A steer ranch operation requires considerable funds each fall for the purchase of calves.

A cow-yearling ranch is really a combination of the cow-calf system and the steer ranch operation and has some of the advantages of each. A safety factor is that calves are not purchased. Straight steer ranch operations are relatively rare in Nebraska.

Ranch Size

The cattle ranch must be large enough in land and livestock to give the operator-manager a satisfactory income. Inefficient use of labor, machinery, and managerial ability is characteristic of small ranch units. Good animal husbandry practices under range conditions become difficult when only a few head of cattle are involved. There is also less incentive for range improvement practices and sound grazing and breeding programs.

Table 15. Efficiency of different size cattle ranches in the Nebraska Sandhills, 1960.[a]

	Very small	Small	Medium	Large	Very Large
Average number of A.U.'s per ranch	122	218	411	762	2041
Total inputs per A.U., $[b]	136	117	104	94	99
Gross income per A.U., $	93	93	84	83	73
Net returns to capital investment per A.U.	$[c] 6	20	25	32	24
A.U.'s per man	105	118	162	209	243
Rate earned on investment, %	.58	2.3	2.8	3.7	2.1

[a] Unpublished data from A. W. Epp, University of Nebraska
[b] Includes cash expenses, operator and family labor, interest on investment, and depreciation.
[c] This includes gross ranch income — (cash expenses + depreciation + operator and family labor).

The minimum size cattle ranch to provide an economic family unit in the northern great plains is about 300 animal units. This is equivalent to 225 cows in a cow-calf operation or 165 cows in a cow-yearling operation. A big share of the ranch investment is often owned by the ranch family. If indebtedness is small or nil, and if the return from this family investment can be used to maintain a satisfactory family standard of living, a somewhat smaller ranch unit can be considered. However, this ignores alternative uses of capital and labor that may be more profitable.

One should consider a greater than minimum size of ranching operation since the minimum is seldom the most profitable. Larger ranch units allow for taking advantage of advancements in nutrition, breeding, marketing of range livestock and in range development.

A 1960 economic survey of different size cattle ranches in the Nebraska Sandhills suggests that large size ranches (762 animal unit average) are more efficient than smaller ranches (Table 15). The large size had the lowest total input per A.U., the highest net ranch income per A.U., and the highest rate of return on total ranch investment. The number of A.U.'s that one man could care for increased as ranch size increased.

The ability of the operator-manager is a principal factor in determining the most economic ranch size. Bigness by no means assures a profitable operation. Under inefficient management a large ranch is a disadvantage.

IMPROVING THE RANGE

Rate of Stocking

Cost of producing a weaner calf or yearling can be effectively reduced by increasing stocking rates on understocked range or where additional carrying capacity has been provided through range development or grazing management. Spreading fixed land costs (largely interest and taxes on land) over a greater number of cows reduces production costs per cow. Land charges per cow decrease as stocking rates increase.

Table 16. Economic analysis of stocking rates on Sandhill range near Woodward, Oklahoma, 1952-1960.

	Rate of stocking		
	Heavy	Moderate	Light
Acres per cow yearlong	12.1	17.4	22.4
Lbs. of calf per cow	314	424	437
Calf sales per cow, $	$ 71.89	$ 94.04	$ 95.43
Cost per cow, $	74.69	85.24	92.57
Land charges, $	18.12	26.18	33.59
Other costs[a] $	56.57	59.06	58.98
Return to management (profit)			
Per cow, $	—2.80	8.80	2.87
Per acre, $	— .23	.51	.13

[a]Labor, supplements, interest on cow, tax and depreciation on cow, death losses, bull costs, veterinary, etc.

However, adding additional cows above proper stocking rates will reduce rather than increase ranch profits. Results of an eight-year experiment at Woodward, Oklahoma, show that either heavy stocking (overgrazing) or light stocking (undergrazing) reduced ranch profits (Table 16).

Although overstocking the range in the Oklahoma study further reduced land charges per cow, this advantage was more than offset by a sharp decrease in pounds of calf produced per cow. This lowered calf production was caused by a reduction in both percent calf crop and in weaning weights. Continued stocking at heavy rates may increase total pounds of calf weaned and gross cattle sales per section but invariably increases gross costs and reduces net returns per section.

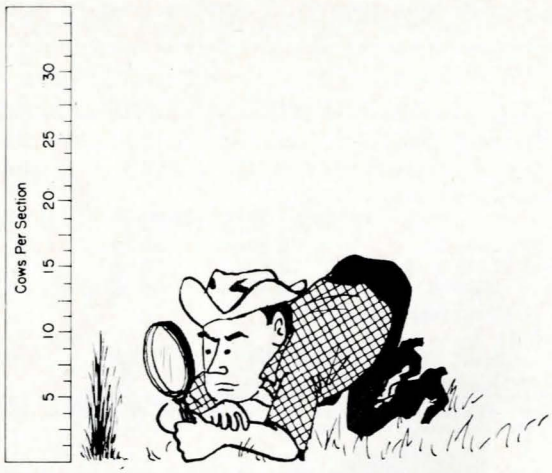
In contrast to land charges, other annual cow costs remain relatively constant. However, increasing stocking rates above capacity may increase the amount of supplements and hay required and raise death losses.

Increase Ranch Carrying Capacity

Effective size of a ranching operation can often be increased without buying more pasture or rangeland. Carrying capacity on most ranches can be further increased through better use of the present forage production and/or increasing forage production through range development. Some possibilities for increasing carrying capacity of your ranch are listed below.

Range Utilization

1. Set stocking rates to keep range in high condition for maximum forage production.
2. Distribute grazing evenly over all parts of the range.
3. Use a system of deferred-rotation grazing on native range to increase vigor, food storage, and reproduction in the important forage plants.
4. Develop stockwater supplies in areas pre-



viously left ungrazed or undergrazed because of no stockwater.

5. Sell off non-productive livestock to save forage.

6. Graze subirrigated meadows on alternate years.

Range and Pasture Development

1. Develop seasonal range in short supply to balance the yearlong forage supply and carrying capacity on your ranch. Seed cool season grasses for grazing April 15 to June 15.

2. Spray weedy range and pasture to kill such pests as sand sagebrush, perennial ragweed, buckbrush, ironweed, and green sagewort.

3. Reseed low condition range, "go-back" land, and less productive cropland to grass.

4. Construct stockwater reservoirs, dugouts or wells in undergrazed areas.

5. Fertilize cool season grass pasture with 30 to 40 lbs. of nitrogen per acre to overcome sod-binding and increase production. (Fertilizing warm season grasses on dryland range is not economical at present in the western 2/3 of Nebraska.)

6. Fertilize subirrigated meadows with phosphate every 4th year with 30-45 lbs. of P per acre and overseed with 4 lbs. of red clover, alsike clover, or alfalfa seed if legumes are absent from the stand. Drain excess water from marshes and meadows if possible.

7. Use such special range land treatments as pitting, water-spreading, or pasture furrowing where adapted.

8. Develop and properly manage irrigated pastures.

9. Develop temporary pasture such as sudangrass, winter wheat, rye, or vetch on croplands.

Returns From Range Development

Production of range and pastures can be greatly increased through such agronomic practices as seeding, weed control, irrigation, and fertilization. Range and pasture development is often one of the most profitable investments the rancher can make. Pounds of calf or yearling produced per acre can be a measure in studying possibilities for increasing land production. Table 17 shows that increasing beef production per acre increases total gross sales of beef per acre.

For example, if a range or pasture produced 40 pounds of calf per acre and calves sold for 25¢ per pound, an increase of 10 percent in pounds of calf produced by range and pasture devolpment would increase the gross sales of beef by $1 per acre. If this same land could be improved by reseeding, fertilizing or other development practices and it increased beef production 100 percent or to 80 pounds per acre, the extra gross sales would be $10 per acre.

A 1960 survey of Sandhill ranches indicated that the annual return on total ranch investment varied between .58 and 3.7 percent when based on current land prices.[4] In contrast to this low return range developments often produce annual returns of 10 or 25 percent or even more.

Table 17. Increased annual gross sales of beef per acre from developing range or pasture.[a]

Expected increase in lbs. of beef	10%		25%		50%		100%	
Expected selling price	25¢	30¢	25¢	30¢	25¢	30¢	25¢	30¢
Lbs. of calf per acre	(dollars per acre)							
100	$2.50	$3.00	$6.25	$7.50	$12.50	$15.00	$25.00	$30.00
80	2.00	2.40	5.00	6.00	10.00	12.00	20.00	24.00
60	1.50	1.80	3.75	4.50	7.50	9.00	15.00	18.00
40	1.00	1.20	2.50	3.00	5.00	6.00	10.00	12.00
20	.50	.60	1.25	1.50	2.50	3.50	5.00	6.00
10	.25	.30	.63	.75	1.25	1.75	2.50	3.00
5	.13	.15	.31	.38	.66	.88	1.25	1.50

[a]This table was developed by multiplying pound of calf per acre by percentage increase by selling price per pound.

[4]Data from A. W. Epp, University of Nebraska College of Agriculture and Home Economics.

Table 18. Estimating additional profit from controlled western ragweed or sand sagebrush.

Net Profit Before Control

Assume: 425 lb. weaning wts., 90% calf crop, value at 28¢ per lb., 20 acres per cow, $100 annual cow cost.

A. Gross sales per acre

$$\frac{425 \times .90 \times .28}{20} = \$5.36$$

B. Annual cow costs per acre $\frac{\$100}{20} = \$5.00$

C. Net return per acre

($5.36 — $5.00) = ... $ .36

Net Profit After Control

Assume: 450 lb. weaning weights, 90% calf crop, 28¢ calves, 16 acres per cow, $91.20 annual cow cost,[a] 39¢ spray charge per acre per year.

A. Gross sales per cow per acre

$$\frac{450 \times .90 \times .28}{16} = \$7.09$$

B. Annual cow cost and control cost per acre $\frac{91.20}{16} + .39 = \$6.09$

C. Net return per acre

(7.09 — 6.09) = ... $1.00

Added Profit

	No ACP	With cost-sharing[c]
A. Additional annual profit per acre	$.64	$.84
B. Annual return on investment in control	21%	56%

[a] Increased carrying capacity reduces land charges.
[b] $3.00 ($2.00 per acre plus factor to cover necessary repeat 50% of the time) @ 5% for 10 year repayment period.
[c] Cost-sharing at $1.50 per acre

Table 18 suggests additional profit that might be expected from controlling dense stands of either western ragweed or sand sagebrush. The profit resulting from such range development as weed control can be found only by comparing net profit after control with net profit before control. To be profitable, the increase in sales of beef per acre resulting from weed control must be greater than the combination of annual cost of weed control per acre and increases in beef production costs per acre. Although increased carrying capacity lowers fixed land costs per cow (land taxes and interest), it also increases total production costs per acre because of adding additional livestock.

Table 19. Estimating returns from fertilizing and clover seeding of subirrigated meadows.[a]

Added income per year

Assume: 1.1 additional tons of hay per acre from 35 lb. P and 4 lb. clover seed, 900 lb. hay equals 1 A.U.M., and an A.U.M. is worth $4.00.

A. Additional income per acre

$$\frac{1.1 \times 2{,}000 \times \$4.00}{900} = \ldots\ldots \$9.78$$

Added cost per year

Assume: 4 lb. legume seed @ 42¢, 35 lb. P at 19.1¢, application charge of $1; treatment effective for 4 years.

A. Additional cost per acre

$$\frac{\$1.68 + \$6.72 + \$1.00}{4} = \ldots\ldots \$2.35$$

Added profit per acre yearly..... $7.43

[a] Single treatment effective for 4 years. Production data taken from Nebraska Outstate Testing Circular 66.

Table 19 estimates possible profit from fertilizing and clover seeding of subirrigated meadows. Additional income per acre was based on lease value of the additional hay when converted to A.U.M.'s. The additional herbage produced could be marketed either through hay or direct grazing

KEYS TO YOUR RANCH BUSINESS

KEEP INFORMED—Keep up on new information and use what you can adapt to your operation.

KEEP RECORDS—This is the only way you can tell what has happened and what is happening on your ranch. It also suggests what to shoot for in the future in costs, production, and returns.

KEEP BALANCED—Develop a livestock program that can be managed within your facilities and resources. No two units are identical—each manager has to work out many of his own practices.

FOLLOW THROUGH—It is useless to spend time and effort on the first three "musts" if you do not continually follow through and get the job done.

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