% + lb. + $ = profit (?)

EQUIVALENT VALUES OF PROFIT DETERMINANTS FOR THE COW HERD

*Calf crop percentage, weaning weights, production costs and selling price determine profit in a cow-calf operation. And these factors do relate.
But how? If production costs increase $50 a year, how many more pounds must sell at what price to cover that increased expense?
The following text and tables offer a guide.*

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Most cow herd producers recognize the factors necessary for the cow herd to be profitable. They are reminded in many ways about the importance of high-percentage calf crops, heavy weaning weights and low production costs. In the final analysis, however, achievement of these production goals does not ensure profitability for the producer. A sufficient price must be obtained to realize a profit. These four factors—calf crop percentage, weaning weights, production costs and selling price—constitute what I label the "profit determinants" of a cow-calf operation.

But how much is an extra 5% calf crop worth in terms of increased weaning weight? In terms of reduced production costs? In terms of price per 100 lb. received for the calves? How much is 25 lb. more average weaning weight worth in terms of percentage calf crop? Of production costs? Of selling price? It is my purpose here to develop these relationships and to present calculations which allow us to describe values of each profit determinant relative to the others.

Relationship of Percentage Calf Crop to Effective Weaning Weight

Effective weaning weight, as used here, refers to the average weaning weight produced per cow. It is calculated by multiplying average weaning weight of all calves by the percentage calf crop. (Calf crop percentage is the number of calves weaned divided by the total number of females exposed to breeding the previous year.)

Table 1—Calculated Effective Weaning Weights

Calf Crop (%)	Average Weaning Weight of All Calves (Lb.)					
	350	400	450	500	550	600
	Effective Weaning Weight (Lb.)					
80	280	320	360	400	440	480
85	298	340	382	425	467	510
90	315	360	405	450	495	540
95	333	380	427	475	522	570
100	350	400	450	500	550	600

Thus, from Table 1, it is apparent that an 80% crop of 450-lb. calves results in the same effective weaning weight produced per cow (360 lb.) as a 90% crop of 400-lb. calves. A 90% crop of 500-lb. calves results in the same effective weaning weight produced per cow (450 lb.) as a 100% crop of 450-lb. calves. Thus, 100 lb. of weaning weight per calf has about the same effect on effective weaning weight as 20 percentage units of calf crop. Or a difference of 50 lb. weaning weight is equivalent in value to 10 percentage units of calf crop. This reduces to equivalent values of: 1 percentage unit calf crop = 5 lb. weaning weight per calf.

calf crop percentages of more than 100% are needed to cover cow costs. However, similar break even percentage calf crops are required when weaning weight per calf increases 100 lb. and selling price of calves declines $10 per cwt. or when weaning weight increases 50 lb. and selling price declines $5 per cwt. For example, when selling price in Table 7 decreases from $55 to $45 per cwt. with an 81% calf crop, weaning weight must increase from 450 to 550 lb. to offset the price decline. Or from Table 8, with an nnual cow cost of $300 and an 84% calf crop, as price declines .rom $65 to $60 per cwt., weaning weight must increase from 550 to 600 lb. to balance the price decline. Thus, an equivalent

Table 8—Necessary Calf Crop Percentages to Break Even When Annual Cow Cost Is $300

Selling Price of Calves ($ per 100 Lb.)	Average Weaning Weight per Calf (Lb.)					
	400	450	500	550	600	650
	Necessary Calf Crop (%)					
60	125	111	100	91	84	77
65	115	103	92	84	77	71
70	107	95	86	78	71	66
75	100	89	80	73	67	62
80	94	83	75	68	63	58

value relationship of 100 lb. weaning weight to each $10 per cwt. selling price differential becomes apparent. Or each 50 lb. weaning weight per calf is about equivalent to a differential of $5 per cwt. in selling price.

It is also apparent from Tables 6, 7 and 8 that when selling prices of calves are high relative to cow costs, even producers who have poor calf crop percentages can show a profit. However, as selling price relative to cow costs becomes narrow, only pro- ·cers who wean high-percentage calf crops can remain pro- ;iLable.

Equivalent Values of Percentage Calf Crop and Annual Cow Cost

Percentage calf crops of 450-lb., 500-lb. and 550-lb. calves necessary to break even when annual cow costs are $100, $200 and $300 and with calf prices at $40-$80 per cwt. were calculated and are summarized in Table 9. From these, the increase in

Table 9—Calf Crop Percentages Needed to Break Even When Annual Cow Cost Is $100, $200 or $300; Weaning Weights Are 450, 500 and 550 Lb.; and Selling Price per 100 Lb. Ranges From $40-$80 per Cwt.

Weaning Weight per Calf (Lb.)	Selling Price per 100 Lb. ($)	Cow Costs per Year ($ per Cow)					
		100		200		300	
450							
	40	56	(55)*	111		—	
	45	49	(50)	99		—	
	50	44	(45)	89	(44)	133	
	55			81	(40)	121	
	60			74	(37)	111	
500							
	50	40	(40)	80	(40)	120	
	55			73	(36)	109	
	60			67	(33)	100	
	65			62	(30)	92	
	70			57	(29)	86	
550							
	60			61	(30)	91	
	65			56	(28)	84	
	70			52	(26)	78	
	75			48	(25)	73	
	80			45	(23)	68	

*Values in parentheses are percentage unit calf crop differentials (increases required) between calf crop percentage values on the same line. Over-all average differential is approximately 35 percentage units.

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percentage calf crop needed to cover a $100 increase in annual cow cost was determined at each selling price (from Tables 6, 7 and 8). With heavier calves or with higher prices, smaller increases in percentage calf crops are needed to compensate for increases in annual cow costs. However, an average increase in calf crop of about 33 percentage units is needed to cover a $100 increase in annual cow cost (varies from a 23-percentage-unit increase for 550-lb. calves selling at $80 per cwt. to a 55-percentage-unit increase for 450-lb. calves selling at $40 per cwt.). Thus, each 10-percentage-unit calf crop increase has the value of decreasing annual cow costs about $30 per year (ranges from $18.18-$43.48—averages near $30).

Consolidation of Equivalent Values

If a 33-percentage-unit increase in calf crop is about equivalent to a $100 increase in annual cow cost, then 10 percentage units of calf crop equal $30 annual cow cost. Because 1 percentage unit of calf crop was equivalent to 5 lb. weaning weight, 10 percentage units of calf crop are about equal in value to 50 lb. weaning weight or $30 annual cow cost. The 50-lb. increment in weaning weight was calculated earlier to be equivalent in value to $5 per cwt. in the selling price of calves.

Thus, the table of equivalent values becomes:

Percentage Unit of Calf Crop	Weaning Weight of Calves (Lb.)	Annual Cow Cost ($)	Calf Price per Cwt. ($)
10	50	30	5
1	5	3.0	0.50

These calculations show that each 1 percentage unit improvement in calf crop that can be obtained (by good management at calving time or by good breeding management, etc.) has the same value as improving average weaning weight by 5 lb. Or each 1 percentage unit improvement in calf crop has about the same value as reducing the annual cost of keeping a cow by $3—or as increasing the calf selling price per hundredweight by $.50. If proper sire selection allows one to improve weaning weight and other management items remain at the same level, an improvement in weaning weight of 15 lb. has the same value as improving calf crop by 3 percentage units or as decreasing annual cow costs by $9 or as selling the calves for $1.50 more per cwt.

Fortunately, improving status in one profit determinant area is not antagonistic to another. Thus, if one simultaneously increases weaning weight by 25 lb. and calf crop percentage by 5%, the combination of these two increases has the same benefit as reducing annual costs by $30 per cow or as increasing the selling price by $5 per cwt. An increase in cow costs of $30 per year can be compensated for by any combination of increasing calf crop percentage, weaning weight or selling price per 100 lb. that have the summed or equivalent value of $30 cow cost a year.　Ⓐ