RANCH CALCULATOR (RANCALC)

(for Lotus-123 and compatible spreadsheets)
A Spreadsheet to aid in planning for cow/calf and cow/calf-stocker operations

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INTRODUCTION

Modern cow/calf operations are highly complex. Planning for these operations requires information from a large number of areas. The addition of a retained ownership phase past weaning further complicates the situation. There is a frequent need to determine "What if" a change were made. While evaluating the effect that a change in even one area (marketing, feeding, stocking density, labor changes, etc.) would have on the profitability of the total operation would be extremely tedious and time consuming, modern desk top computers and spreadsheet programs permit analysis to be both simple and quick. **RANCALC** is a spreadsheet designed at OSU that should assist the manager in planning and analysis. This is an updated version of an OSU program named **COWHERDE**, designed for Visicalc spreadsheets.

RANCALC can be used to input cow/calf and stocker information for an individual beef cattle operation. From these inputs, the program calculates net operating returns and annual cash flow for the ranch under different production-marketing alternatives available to the manager.

RANCALC is a template designed to run with LOTUS-123 or compatible spreadsheets. Because it is a rather lengthy spreadsheet, it comes set to the **MANUAL** recalculation mode. In this mode, data may be entered without the program recalculating after each entry. This will be especially convenient if the computer used is slow. When recalculation is desired, the user presses **THE F9** key. With newer, faster computers, the program may be set to **AUTOMATIC** mode by entering the following keystrokes: **/WGRA**. Manual mode may be reset by typing: **/WGRM.**

RANCALC is also available in compiled form. This permits use of the spreadsheet by users who do not have LOTUS 123 or compatible spreadsheet software. Operation is very similar to that of LOTUS 123. The major difference is that equations used in the spreadsheet cannot be seen or altered.

ENTERING DATA ONTO RANCALC

The spreadsheet, as it will appear on the screen and be printed out, is shown in Table 1. Data are entered by moving the cursor to the desired coordinate and entering the appropriate information. Values generated by the program are "protected" so that they cannot be accidently overwritten and the equations erased. Coordinates for data entry are unprotected and will appear highlighted on the screen. Users unfamiliar with the operation of LOTUS 123 should review an instruction manual or have someone give them a short lesson in the basic commands such as retrieving a file, saving a file, etc.

For purposes of explanation, the spreadsheet shown in Table 1 has been divided into sections A-K under EXPENSES and sections A-E under PRODUCTION. Sample data in the program illustrate a native range-based, spring-calving cow/calf operation in Oklahoma in which all land is rented. Weaned calves are retained as stockers on rented wheat from November until sold in mid-March.

SECTION A: CATTLE INVENTORY INFORMATION

This spreadsheet divides the cow herd into three classes, MATURE COWS, 1ST CALF HEIFERS AND YEARLING HEIFERS because these are the logical sorts to be made for optimum nutritional management. Two classes of stockers, HEIFERS and STEERS are provided. For classes of cattle to be used in the analysis, enter a 1 under Class to be used and a 0 (zero) for classes not used. Then enter the number of

animals for each class Entering a zero under CLASSES OF CATTLE USED zeroes all calculations for that class of cattle and permits quick evaluation of strategies with and without one or more classes. If one or more classes of cattle are not used, it may be convenient to have the program suppress all zeroes so that only data used show up. Zeroes can be suppressed by the following keystrokes /WGZY The percent ownership (equity) should also be entered for each class of cattle.

It is anticipated that producers may retain their own calves as stockers, purchase stockers or have a combination of retained and purchased stockers. If stockers are purchased, the purchase price should be entered along with weight, estimated gain, death loss, and days of ownership. Producers retaining their own calves shall use an estimated average weight and value for calves at weaning and "sell" them to their stocker enterprise to permit later analysis of the stockering alternative The average value may not exactly equal the actual market values when sold at weaning.

The program tentatively labels stockers as "steers" and "heifers " However, the two categories of stockers can be used to represent two qualities, two weights or two prices for stockers Labels in the program are protected but can be changed by removing the protection and retyping the label Users who are unsure about how to do this should consult their Lotus 123 manual or get help from a qualified individual

SECTION B: PASTURE VALUE, RENTAL RATES AND STOCKING DENSITY

Land may be owned, rented or a combination. Three types of land (pastures) that can be owned and/or rented are possible Land (pasture) types may be labeled by the user under the heading of owned land and will be copied by the program elsewhere in the spreadsheet where type of land is needed If the spreadsheet is in manual recalculation mode, press the **THE F9** key for pasture types to be copied

For owned land, enter the description (native etc), no. of acres/type, % ownership or equity, value/acre and taxes/acre. The total value of the land and total interest/year will be calculated Note that interest will not be calculated until an interest rate for land is entered further down in the spreadsheet. For rented land, enter the number of acres and the yearly rental rate/acre. The total of all rented and owned land will be calculated at the right side of the screen.

Next, enter stocking rates for all classes of cattle and pastures used The number of cattle of each class should be entered for each pasture type as well as the number of acres/animal under each pasture type. The total acres per pasture and total acres for all pastures are calculated at the right side of the screen This number should be checked against the calculated sum of rented and owned land. If the two numbers are not sufficiently similar, cattle numbers, stocking rates or acreage should be changed

For purposes of demonstration, Table 1 contains example data for an Oklahoma spring-calving cow/calf operation with cows maintained on native range and their calves retained after weaning for grazing on wheat pasture. This example was chosen because it demonstrates the use of two types of pasture in a retained ownership operation.

SECTION C: FEED AND HAY COSTS

The user has a choice of up to four feeds. Two are tentatively named SUPPLEMENTS and two are named HAYS. The labels for types of feed can be changed from the keyboard. The cost/ton, feeding rate/head/day, and the total number of days fed are entered. The total cost of each feed type for each class of cattle is then calculated. If hay is purchased, the delivered price would be entered here If hay is raised, the estimated total cost of the home-grown hay may be entered in this section or the total cash cost of hay can be calculated in Section D from all cash costs involved in raising and hauling the hay For the example shown in Table 1, it was assumed that all hay was purchased at a cost of $60/ton. Mineral-salt costs are entered as the total $/head/year.

SECTION D: PASTURE CASH COSTS

Cash costs/acre for fertilizer, hired tillage, seed, spraying and haying are entered under each pasture type. Total cash cost/acre and cost/farm are calculated.

SECTION E: CATTLE CASH COSTS

Cash costs/head for insect control, vet costs, hired hauling, ad valorem taxes and marketing may be entered here. Note that costs such as hauling and marketing are affected by retention plans. Total cash cost/head and cost/farm are calculated.

SECTION F: MACHINERY, EQUIPMENT AND FACILITIES

The annual ownership and maintenance costs for vehicles, equipment, facilities, fences and buildings are entered in this section. Annual costs for depreciation are calculated based on the years of ownership and the difference between purchase price and salvage value. If the user deems it more appropriate to use the replacement cost for an item rather than the original purchase price, the replacement cost should be entered. Interest cost is calculated from the average of purchase cost and salvage value multiplied by percent ownership and interest rate. Interest rates are entered in SECTION K.

SECTION G: HIRED LABOR PER YEAR

Enter total costs of hired labor for the entire ranch for the year.

SECTION H: MISCELLANEOUS OVERHEAD PER YEAR

Enter total overhead costs not accounted for in other categories This could include costs for legal fees, insurance, consulting, business-related travel, seminars, computer software, etc

SECTION I: ALLOCATION OF EQUIPMENT AND FACILITIES USE TO COW HERD AND STOCKERS

Enter the percent of time each item is used by the cow herd Since the total percent must add up to 100, the percent of time used by stockers is computed automatically

SECTION J: BULL COSTS

This section permits calculation of fixed and variable costs for breeding bulls Because different types (breeds) of bulls are frequently used for mature cows and heifers, information is entered by class of breeding female. The number of bulls is the total number used for each class of female. Normal female:bull ratios range from 15:1 to about 40:1 depending on age of bull, pasture size, etc Maintenance costs for bulls include feed, vet costs, fertility testing, hauling, etc. and are entered as costs per head per year. Ad valorem taxes are also entered on a per head per year basis. Depreciation costs for bulls are calculated based on the difference between purchase cost and salvage value, divided by years in the herd Interest cost is calculated from the average of purchase cost and salvage value multiplied by percent ownership and interest rate. Interest rate for bulls is entered in SECTION K Land requirements for the bulls are assumed to be included in the land provided for the cow herd

SECTION K. INTEREST SUMMARY

Operating interest is partitioned between the cow herd and stockers by entering the percent of operating capital borrowed for each class of cattle and the average number of months the capital is borrowed Interest rates for each category of loan are entered where indicated

SUMMARY OF EXPENSES

The merits of listing expenses on a per head basis versus an enterprise or total farm basis are frequently debated. There are problems with analyzing a ranch enterprise on a per head basis and an economist should be consulted when evaluating any venture as complicated as a cattle operation. Expenses are calculated and shown in this section of the spreadsheet on a per head basis in order to better evaluate the relative costs for different items and to compare relative costs for the different classes of cattle.

Cash costs are itemized and include operating interest and actual interest costs for ownership of stockers. Fixed costs in this budget include depreciation, insurance, taxes and interest on borrowed capital.

PRODUCTION SECTION

SECTION A: NUMBER OF CALVES PRODUCED

Enter the percent weaned calf crop expected for mature cows and 1st calf heifers. The number of calves produced are calculated using the percent calf crop and the number of cows and heifers in the herd.

SECTION B: RECEIPTS SUMMARY

Enter the number of steer calves, heifer calves and cull cows to be sold from mature cows and 1st calf heifers. The expected sale weights and prices must also be entered Value per head and total receipts for each class of cattle will be calculated. Enter also any expected sales of replacement heifers. Some pencil work may be required to determine the numbers of each class of cattle to be sold because some heifers may be retained for breeding replacements and varying numbers of calves may be retained for stockers, etc

Total numbers of cows and calves sold should closely approximate numbers of cull cows and calves produced. For convenience, subtotals of calves and cows sold under each class of cattle are calculated by the program. Remember not to sell heifer calves to be kept as breeding replacements. The number of stocker steers and heifers to be sold and sale weights will be calculated by the program based on the numbers of stockers, expected death loss, daily gain and length of ownership.

BUDGET ANALYSIS

C: ANNUAL PROFIT OR LOSS

The total of variable costs, fixed costs and costs of purchased stockers (from Section A) are shown and are subtracted from total receipts to estimate annual returns to owned capital, operator labor, owned land, management and risk. The total amounts of owned capital (cows, heifers, stockers, bulls, vehicles, equipment, and facilities) and owned land are also displayed.

D: ANNUAL CASH FLOW

The annual cash flow is also generated Depreciation and interest payments (other than for operating capital) are added back to the returns to owned capital, labor, owned land, management and risk. The user may add off-farm income and subtract actual interest and principle payments for land, cattle, facilities, vehicles, buildings, etc. to calculate net cash flow for family and investment use.

E: EVALUATION OF COST OF BEEF PRODUCTION

One method of comparing management practices for cow/calf and stocker enterprises is to calculate the costs for producing a pound of beef. This calculation is shown for both fixed and variable costs for the cow herd (selling weaned calves and cull cows) and for stockers By adding fixed and variable costs, a breakeven price is computed. The breakeven price for the cow herd is a composite of weaned calves and cull animals. This mix of calves and culls can be important because strategies that change this mix can affect the average sale price from the cow herd. The breakeven price for stockers is the sum of fixed and variable costs plus the purchase cost of the stockers These calculations should aid in decision making about retention strategies, culling strategies and other management options.

SUMMARY

Spreadsheets offer tremendous flexibility for users. For the beginning user, there is the capability to quickly analyze complex management options with the existing spreadsheet As users becomes more experienced, they may wish to customize this spreadsheet for their particular ranching situation by changing or adding calculations. This is done by first saving the original spreadsheet, then removing the cell protection and making changes. It must be emphasized that this be done only after making a backup copy and after gaining experience in spreadsheet programing.

SELECTED REFERENCES

1   Walker, O L., K.S Lusby and W E. McMurphy 1987 *BEEF AND PASTURE SYSTEMS FOR OKLAHOMA - A BUSINESS MANAGEMENT MANUAL*, Oklahoma Agricultural Experiment Station, Research Report P-888.

2   *THE OKLAHOMA BEEF CATTLE MANUAL, 2nd Ed.* 1988. Oklahoma Cooperative Extension Service, K.S. Lusby, Editor.

TABLE 1.

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                    RANCH CALCULATOR (RANCALC)
                         EXPENSE SECTION
A   CATTLE INVENTORY
                           MATURE   1ST CALF YEARLING STOCKER   STOCKER
                            COWS    HEIFERS  HEIFERS  STEERS    HEIFERS

CLASS OF CATTLE USED
1=YES, 0=NO                    1        1        1        1         1
  NO  HEAD                    200       33       40       98        58
  % OWNED (EQUITY)            100      100      100        0         0
  PURCH  WT  STOCKERS ONLY                              540       510
  PURCH  $/100, STOCKER                                98 00     88.00
  EST  ADG, STOCKERS                                   2 25      2 10
  % DEATH LOSS, STOCKERS                               1 00      1.00
  DAYS OWNED, STOCKERS                                  135       135
  $/HEAD, COWS & HEIFERS      850      850      650
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B   PASTURE TYPES, STOCKING RATES, TAXES, RENTAL RATES, AND % OWNERSHIP

OWNED LAND (SPECIFY TYPES)	NO ACRES	% EQUITY	$/ACRE	TOTAL $ VALUE	$ TAX/ACRE	INTEREST PER YR
NATIVE	0	0	0.00	0	0.00	0
B	0	0	0.00	0	0 00	0
C	0	0	0 00	0	0 00	0
TOTAL OWNED	0					

RENTED LAND	NO. ACRES	$ PER ACRE/YR			
NATIVE	2570	8.00	RENTED + OWNED A=		2570
WHEAT PASTURE	312	22 50	B=		312
C	0	0.00	C=		0
TOTAL RENTED	2882		RENTED + OWNED		2882

	MATURE COWS	1ST CALF HEIFERS	YEARLING HEIFERS	STOCKER STEERS	STOCKER HEIFERS	
CATTLE/PASTURE	200	33	40	98	58	
NATIVE	200	33	40	0	0	
WHEAT PASTURE	0	0	0	98	58	ACRES
C	0	0	0	0	0	PER
ACRES/ANIMAL						PASTURE
NATIVE	10 0	10 0	6 0	0 0	0 0	2570
B	0 0	0.0	0 0	2 0	2 0	312
C	0 0	0.0	0 0	0 0	0 0	0
			TOTAL ACRES IN ALL PASTURES			2882

C   FEED AND HAY COSTS

		MATURE COWS	1ST CALF HEIFERS	YEARLING HEIFERS	STOCKER STEERS	STOCKER HEIFERS
SUPP #1	$/TON	200 00	200.00	165 00	0 00	0 00
	LB/HD/DAY	3.00	4 00	6 00	0 00	0 00
	DAYS FED	180	180	180	0	0
	TOTAL $	54 00	72 00	89.10	0.00	0 00
SUPP #2	$/TON	0.00	0 00	0 00	165.00	165 00
	LB/HD/DAY	0.00	0.00	0.00	4.00	4 00
	DAYS FED	0	0	0	50	50
	TOTAL $	0.00	0 00	0.00	16 50	16 50
HAY #1	$/TON	60.00	60.00	60 00	60 00	60 00
	LB/HD/DAY	20 00	20 00	15 00	12 00	12 00
	DAYS FED	21	50	50	21	21
	TOTAL $	12.60	30 00	22.50	7 56	7 56
HAY #2	$/TON	0.00	0 00	0 00	0 00	0 00
	LB/HD/DAY	0 00	0 00	0.00	0.00	0.00
	DAYS FED	0	0	0	0	0
	TOTAL $	0.00	0 00	0 00	0 00	0 00
MIN-SALT	$/YEAR/HD	7.00	7 00	6 00	4.00	4 00
	TOTAL $	1400	231	240	392	232

D   PASTURE CASH COSTS ITEMIZED BY PASTURE

ENTER CASH COST/ACRE	NATIVE	B	C
FERTILIZER	0 00	0 00	0.00
TILLAGE (HIRED)	0 00	0 00	0.00
SEED	0 00	0 00	0.00
SPRAYING, BURNING	1 50	0 00	0 00
HAYING (HIRED)	0.00	0 00	0 00
TOTAL $/ACRE	1 50	0 00	0 00
TOTAL $/FARM	3855	0	0

E   CATTLE CASH COSTS

COSTS, PER HEAD	MATURE COWS	1ST CALF HEIFERS	YEARLING HEIFERS	STOCKER STEERS	STOCKER HEIFERS
DEWORM, SPRAY, ETC	10.00	10 00	6 00	5 00	5 00
VACCINES,VET,DRUGS	10 50	13 50	12 00	9 00	9 00
HAULING, (HIRED)	0 00	0 00	0 00	0 00	0 00
MARKETING	0 00	0 00	0 00	12 00	12 00
TAXES, AD VALOREM	5 00	5 00	3 00	0 00	0 00
TOTAL $/HEAD	25 50	28 50	21.00	26 00	26 00
TOTAL $/FARM	5100	941	840	2548	1508

F   MACHINERY, EQUIPMENT AND FACILITIES

	VEHICLES, TRACTORS EQUIP, TRAILERS	WORKING FACILITIES FENCES, BUILDINGS
COST	35000	7500
% EQUITY	65	100
YEARS LIFE	8	25
SALVAGE VALUE	16000	2500
REP & MAINT./YR.	950	250
TAXES	400	100
INSURANCE	600	200
FUEL, LUB, UTIL.	4500	250
DEPRECIATION	2375	200
INTEREST	1071	0

	$/YR
G. HIRED LABOR/YR	10000
H MISC OVHD/YR	1200

I. BREAKDOWN OF USE ON THE FARM
        (ENTER APPROXIMATE % OF TIME USED FOR EACH CLASS)

	COW HERD	STOCKERS
MACHINERY AND EQUIPMENT	90	10
WORKING FAC , FENC, BLDGS.	90	10
LABOR, (HIRED)	90	10
MISC. FARM OVERHEAD	90	10

J. BREEDING BULLS

	MATURE COWS	1ST CALF HEIFERS	YEARLING HEIFERS
NO. OF BULLS	6	1	1
PURCHASE COST/HD	2000	2000	2000
% OWNED	100	100	100
YRS IN USE	4	4	4
SALVAGE VALUE	1200	1200	1100
MAINT COST/YR.	150	150	150
TAX, AD VALOREM	5	5	5
DEPRECIATION	1200	200	225
INTEREST	0	0	0

K.   INTEREST SUMMARY

	FOR COWHERD	FOR STOCKERS
PERCENT OF OPER CAPITAL BORROWED	75	100
MONTHS OPER CAPITAL IS BORROWED	9	6

INTEREST RATES (%)

OPERATING CAPITAL	MACH & EQUIP	LAND	COW HERD	STOCKERS
12 00	12 00	11 00	12 00	12 00

SUMMARY OF EXPENSES FOR THIS PLAN   (PER HEAD BASIS)

ANNUAL CASH COSTS	MATURE COWS	1ST CALF HEIFERS	YEARLING HEIFERS	STOCKER STEERS	STOCKER HEIFERS
SUPPLEMENT 1	54 00	72 00	89 10	0 00	0 00
SUPPLEMENT 2	0 00	0.00	0 00	16 50	16 50
HAY 1	12.60	30 00	22.50	7 56	7 56
HAY 2	0 00	0.00	0.00	0.00	0 00
MIN & SALT	7.00	7.00	6.00	4 00	4 00
PASTURE RENT	80 00	80 00	48.00	45 00	45 00
PASTURE COST	15.00	15 00	9 00	0 00	0 00
PEST CONTROL	10.00	10 00	6.00	5 00	5 00
MED & VETR	10.50	13 50	12.00	9 00	9 00
HAULING, HIRED	0.00	0.00	0.00	0 00	0 00
MARKETING	0 00	0 00	0.00	12 00	12 00
FAC.,FEN, & BLDGS	1.65	1 65	1 65	0.32	0.32
VEH. & MACH.	17 97	17 97	17 97	3 49	3 49
MISC. COSTS	3 96	3 96	3.96	0.77	0 77
HIRED LABOR	32 97	32.97	32 97	6 41	6.41
BULLS	4 50	4 55	3.75		
OPERATING INTEREST	9 00	10 39	9 10	1.72	1 72
INT. ON STOCKERS				23 81	20.20
TOTAL VARIABLE COSTS/HEAD	259 14	298 97	261.99	135 59	131 97

FIXED COSTS: (DEPR., INS., TAXES, INTEREST ON BORROWED CAPITAL)					
VEHICLES, ETC.	14.66	14 66	14.66	2 85	2 85
EQUIP.& FENCES	1.65	1.65	1.65	0.32	0 32
LAND	0.00	0.00	0.00	0 00	0 00
BULLS	6 03	6 21	5.75		
COW HERD	5 00	5.00	3 00		
TOTAL FIXED COSTS/HEAD	27.33	27 52	25.06	3 17	3.17

	MATURE COWS	1ST CALF HEIFERS
A. WEANING RATE, %	85	80
CALVES WEANED	170	26

B. RECEIPTS SUMMARY

FROM MATURE COWS	NO SOLD	WEIGHT	$/100LB	$/HEAD	TOTAL $
STEERS	85	550	98	539 00	45815
HEIFERS	45	530	88	466 40	20988
CULL COWS	30	1000	58	580 00	17400
SUBTOTAL CALVES ONLY	130	70600			84203
CULLS ONLY	30	30000			
CALVES & CULLS	160	100600			

FROM 1ST CALF HFRS.	NO SOLD	WEIGHT	$/100LB	$/HEAD	TOTAL $
STEERS	13	475	98	465 50	6052
HEIFERS	13	450	88	396 00	5148
CULL HFRS	2	850	65	552 50	1105
SUBTOTAL CALVES ONLY	26	12025			12305
CULLS ONLY	2	1700			
CALVES & CULLS	28	13725			

	NO	WEIGHT	$/100LB	$/HEAD	TOTAL $
REPL. HEIFERS SOLD	6	750	80	600.00	3600

COW HERD TOTALS	NO. HEAD	TOTAL LBS			TOTAL $
CALVES ONLY	156	82625			78003
REPL. HEIFERS	6	4500			3600
CULLS ONLY	32	31700			18505
TOTAL SOLD	194	118825			100108

	NO SOLD	WEIGHT	$/100LB	$/HEAD	TOTAL $
FROM STOCKER STEERS	97	843.75	89	750 94	72856
FROM STOCKER HEIFERS	57	793 5	84	666.54	38273
STOCKER SUBTOTAL	154	127423			111129

COW HERD + STOCKERS	348	246248 TOTAL RECEIPTS ($)	211236

C ANNUAL PROFIT OR LOSS

TOTAL RECEIPTS ($)	211236	
MINUS ($)	93117	VARIABLE COSTS
MINUS ($)	7871	FIXED COSTS
MINUS ($)	77892	PURCHASED STOCKERS (SECTION A)
EQUALS($)	32357	RETURN TO OWNED CAPITAL, $ 270300
		OPER. LABOR, OWNED LAND
		MGMT , AND RISK. $ 0

D· ANNUAL CASH FLOW ($)

	32357	RETURN TO OWNED CAPITAL, OP LABOR
		OWNED LAND, MGMT, AND RISK
PLUS ($)	6531	DEPRECIATION & INTEREST INCLUDED
		IN LAND, CATTLE, BLDG, ETC PAYMEN
MINUS ($)	0	VEHICLES AND EQUIPMENT PAYMENTS
MINUS ($)	0	LAND PAYMENTS
MINUS ($)	0	CATTLE PAYMENTS
MINUS ($)	0	BLDG. ETC , PAYMENTS
PLUS ($)	0	OFF-FARM INCOME
EQUALS($)	38888	ANNUAL CASH-FLOW FOR FAMILY LIVING,
		INVESTMENT, SAVING, ETC.

E: EVALUATION OF COST OF BEEF PRODUCTION

		COW HERD	STOCKERS
TOTAL BEEF SOLD	(LB)	118825	127423
VARIABLE COSTS	$/CWT	60.74	16 44
FIXED COSTS	$/CWT	6 21	0 39
STOCKER COST	$/CWT		61.13
TOTAL COSTS (BREAKEVEN)	$/CWT	66 95	77 95

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