

ESTIMATING FEEDLOT COSTS USING AN ELECTRONIC SPREADSHEET

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Large feedlots or those having access to least cost rate of gain linear computer programs will probably continue to use those powerful tools. However, smaller feedlots, individuals with few choices of feedstuffs and farmer feeders are likely to find this program for calculating feedlot costs useful.

The program is developed for use with Supercalc and requires 15-17 data inputs from the producer. The user can specify the sex of the cattle, their frame size and various backgrounds. The input items that are required are listed below and are in the same order that they appear on the screen.

1. Cost of cattle delivered to the lot in \$/cwt.
2. Weight of cattle when purchased.
3. Days on feed.
4. The sex, frame size and background of cattle.
5. Feed cost per ton as fed (as is) basis.
6. Dry matter of the ration.
7. What you expect to sell the cattle for at the end of feeding.
8. Equity in cattle in dollars per head (interest free money).
9. Interest rate on money to buy cattle.
10. Medical costs in dollars per head.
11. Death loss in percent.
12. Yardage cost in dollars, if any.
13. Transportation in dollars/head.
14. Commission as % of the total selling price.
15. Estimated feed intake per day in lbs. of dry matter.
16. Your estimate of average daily gain in lbs.
17. Interest rate on operating capital.

Optional Input (entered on a 100% dry matter basis)

18. Net Energy for Maintenance of ration (NEm in megcal/cwt).
19. Net Energy for Gain of ration (NEg in megcal/cwt).

Based on the input information, financial and performance results are presented. If optional data on the energy of the ration is used the program presents three estimates; user values, calculated expected performance and the average of these two predictions.

The spreadsheet is extremely foolproof because the only entries allowed are those for input (these are marked with an *), the rest of the worksheet is protected from any change. The actual calculations are complex and use an iterative technique which requires at least 5 recalculations until the results converge on a stable answer. This is easily done by pressing the exclamation mark (shift !) to force a calculation. This can be done until no further changes are made on the recalculation.

When a printed copy is desired follow the recommendations in the print range listed near the top of the worksheet. Some figures used in calculations are on the worksheet but are only of technical interest. These figures are excluded when printing the suggested print range.

The value of the program is to try a number of combinations on a trial and error basis. The more successful trials can be put into practice. The computer permits a large number of trials in a very short time.

Attached is a sample print out of the worksheet. For further information contact the author.

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Visicalc version developed by Don Gill, Oklahoma State University, 1983.

Supercalc version adapted and developed by Daniel J. Drake, University of California, 1984.

3-8-84 100 copies

Revised 2-4-85 200 copies

1 A 11 B 11 C 11 D 11 E 11 F 11 G 11 H 1
 11 COST OF GAIN CALCULATOR PRINT RANGE IS A1:H60

21
 31 IMPORTANT !! THIS PROGRAM USES A MANUAL ITERATIVE TECHNIQUE. PRESS
 41 SHIFT ! AT LEAST 5 TIMES AFTER WEIGHT, FEED, OR ENERGY
 51 VALUES ARE CHANGED OR UNTIL "MEAN FEEDING WEIGHT" DOES
 61 NOT CHANGE ANY ON RECALCULATION.

71
 81 VALUES MARKED (*) MAY BE CHANGED OTHERS ARE THE RESULT OF CALCULATION
 91 AND SHOULD NOT BE CHANGED OR EQUATIONS MAY BE ERASED.

101
 111 SEX, FRAME AND BACKGROUND CONSIDERED BY THIS PROGRAM:

- 121 1= Medium frame steers
 131 2= Large frame steers, or compensating med. frame yearling steers, or
 141 medium frame bulls
 151 3= Large frame bull calves, or compensating lge. frame yearling steer
 161 4= Medium frame heifers
 171 5= Large frame heifers, or compensating yearling heifers
 181 6= Mature thin cows

191 -----
 201 CATTLE COST \$/CWT * 68.00 **** OPTIONAL INPUTS *****
 211 PURCHASE WEIGHT LBS. * 700 * RATION NEm * 92.00
 221 DAYS ON FEED * 135 * RATION NEg * 61.00
 231 SEX/FR./BKGD CODE 1-6 * 1 * (AVE. ENERGY FOR FEED PERIOD)
 241 FEED COST PER TON 'AS IS' * 121.00 *****
 251 RATION DRY MATTER (%) * 87 FEED COST DRY BASIS/TON 139.08
 261 SELLING PRICE \$/CWT * 65.35 MEAN FEEDING WT. 912

271 -----
 281 (INPUTS) TOTAL COST \$ COST/DAY
 291 EQUITY IN \$/HEAD * 75.00
 301 CATTLE INTEREST RATE % * 13.00 19.55 .14
 311 MEDICAL COST \$/HEAD * 7.00 7.00 .05
 321 DEATH LOSS % * .75 3.62 .03
 331 YARDAGE COST \$/DAY * .05 6.75 .05
 341 TRANSPORTATION \$/HEAD * 14.00 14.00 .10
 351 COMMISS. % OF SELL INCOME * .00 .00 .00
 361 FEED INTAKE (100% DM) * 20.00
 371 EST. DAILY GAIN (PAY) * 2.75
 381 OPERATING CAPITAL INTEREST * 13 4.83 .04

391 -----
 401 FEED COST/HD 187.76 1.39
 411 NON-FEED TOTAL 55.75 .41
 421 TOTAL COST 243.51 1.80
 431 -----

441 YOUR **USING** MEAN
 451 VALUES NET ENERGY VALUES VALUES
 461 DAILY GAIN (LBS.) 2.75 3.14 2.94
 471 FEED/LB. GAIN (100% DM) 7.27 6.38 6.82
 481 COST OF GAIN FEEDLOT \$ 53.37 46.79 50.08
 491 COST OF GAIN TOTAL \$ 65.59 57.51 61.55
 501 SELLING WEIGHT LBS. 1071.25 1123.45 1097.35
 511 TOTAL DOLLARS RETURNED 700.06 734.17 717.12
 521 TOTAL LESS CATTLE COST \$ 224.06 258.17 241.12
 531 BREAK-EVEN SELLING PRICE 67.17 64.04 65.61
 541 PROFIT OR LOSS PER HEAD -19.45 14.66 -2.39
 551 RETURN ON EQUITY INVESTED % -70.11 52.86 -8.63
 561 -----

571
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ESTIMATING PASTURE COSTS WITH AN ELECTRONIC SPREADSHEET

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Running stockers on pasture can be one of the biggest crap shoots in the cattle business. Electronic spreadsheets on microcomputers won't remove all the gamble but will permit a more eyes open approach before mortgaging the ranch.

This program is for use with Supercalc (an electronic spreadsheet) and permits the rapid calculation and comparison of financial and performance estimates for cattle on pasture. The program called PASTURE or PAS/MON accepts inputs commonly associated with purchasing cattle to be grazed and calculates various performance, costs and returns. Twelve different input items are required plus 10 optional inputs. Results are given for daily gains from .5 to 2.25 pounds per day, in .25 pound increments. A table of sale weights and corresponding prices is provided by the program but can and should be changed by the user to reflect expected prices at the end of the pasture period. The entire program is protected to allow user entry of only specific input items.

Items to enter into the computer and in the order presented on the video screen are:

1. Cost of cattle on a cwt basis.
2. Purchase weight of cattle.
3. The number of days the cattle will be pastured.
4. The equity in the cattle on a \$/head basis (interest free money).
5. Interest rate on borrowed money for the cattle.
6. Pasture cost in dollars per cwt per month for PASTURE or dollars per head per month for PAS/MON.
7. Medical costs in dollars per head for the entire period.
8. Death loss as a percent.
9. Labor costs in dollars per head.
10. Costs associated with marketing in dollars per head.
11. Any fixed costs in dollars per head.
12. Interest on operating capital.

Optional input

1. Cost of implants if used.
2. If implants are used. 0=No, 1=Yes
3. Increase in gain due to implant, %.
4. If Rumensin is used. 0=No, 1=Yes
5. Rumensin increase in lbs. per day.
6. If a supplemental energy or protein feed is used.
7. Increase due to energy in lbs/lb feed.
8. Increase due to protein in lbs/lb feed.
9. Amount of supplement.

Daily and total costs for the various input items are displayed near the center of the worksheet (Column F7 to H23). The results of primary interest are displayed under "Cost of Gain depending on Rate of Gain", which is found toward the bottom of the display. The results of the required inputs are found under columns titled "Base". If options are included their effect on performance is found under "Est.". By comparing these columns you can see the effects of the optional items.

A 'lookup' table of sale weights and prices is used to determine the sale price after the pasture period. These weights and prices may be changed but the weights must range from the lightest weight to the heaviest weight if the weights are changed. The prices can be in any corresponding order provided the weights go from lightest to heaviest.

After the entry of new inputs, recalculations can be made by pressing the SHIFT ! (exclamation mark). The speed of calculations permit the examination of numerous examples, many more than possible by hand calculations.

Optional items increase performance by the amounts that the user specifies. The response to implants should be entered as the percent increase in average daily gain. Rumensin response is entered as the additional pounds of gain per head per day. Supplemental feeds can be energy or protein type feeds or both. The increased performance due to supplements is entered by the additional pounds of gain per pound of supplement. Different responses can be entered for energy or protein.

The results of specific trials can be printed at any time by using the standard Supercalc commands (/OD and then the suggested print range). If your printer will print in a compressed mode of 17 characters per inch then the entire worksheet will be printed on one sheet of standard 8 1/2 column paper (8 1/2 inches wide).

A sample output in compressed print is attached. Contact the author for further information.

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LIVESTOCK PRODUCTION COSTS: THE COMPUTER APPROACH

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In the last 15 years there have been no new economic principals, there has however been a dramatic change in the delivery system of economics along with other agricultural management tools. The computer has completely changed the methods of data collection and the manipulation of information.

Numerous computer applications exist for calculating costs of production for livestock operations. Each has strengths and weakness, with the user exploiting the areas he or she wishes to dramatize. The costs demonstrated today while by design weak in thoroughness and consequently accuracy permit supreme "what if" potential. Improved accuracy can be obtained with this spreadsheet, but the user has to work at it. Accepting the spreadsheet design, the user can examine a large variety of management changes for impact on profitability.

General information in this spreadsheet (LCOSTS) is used by the computer to generate other values throughout the worksheet. Consequently a change in calf crop, number of cows, replacement rate or cow death loss will be reflected in a other areas. For example, changing the calf crop percent will simultaneously increase the number of calves sold but also the feed expenses and labor requirements.

The program has numerous general formulas to calculate average costs. These can be used by the operator, however if the user has known costs the generalized values can be overridden producing a more individual cost of production. Statements providing further explanation about each entry item can also be found on the spreadsheet to assist the user in individualizing the data. The values shown here are general in nature and should serve only as a point to start discussion.

The real value of computerized production costs is to use the economic principals of the past in a new way to examine management options quickly, and without risk. The results can be used to support operator ideas, perhaps enhancing the possibility of financial support and overall success.

Presented at Regional Computer Meetings, Yreka, Tulelake, Alturas, McArthur and Redding, Calif. February 13-15, 1985.

| L I V E S T O C K P R O D U C T I O N C O S T S | | | | | | | 2/10/85 | | G I | | |
|---|----------------------------------|-------------|------------|-----------------------|----------|------------------|---------------|--|-----|--|--|
| Daniel Drake, Livestock Extension Advisor | | | | | | | | | | | |
| Univ. of Calif., Coop. Extension, Siskiyou County | | | | | | | Print A1:G65 | | | | |
| General Info. | | Wt. each | Unit | Price or Cost/unit | Quantity | Value or Cost | % of Total | | | | |
| 7 | Cow herd | | Head | | 300 | | | | | | |
| 8 | Calf crop | | Head | | | | | | | | |
| 9 | Heifer repl. rate | | Head | | | | | | | | |
| 10 | Death loss, cows | | Head | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | GROSS RECEIPTS | | | | | | | | | | |
| 13 | Steer calves | 460 | Lbs. | .70 | 90 | 28980.00 | 33 | | | | |
| 14 | Heifers calves | 415 | Lbs. | .60 | 50 | 12450.00 | 14 | | | | |
| 15 | Year. steers | 700 | Lbs. | .63 | 30 | 13230.00 | 15 | | | | |
| 16 | Year. heifers | 600 | Lbs. | .59 | 10 | 3540.00 | 4 | | | | |
| 17 | Cull cows | 1100 | Lbs. | .42 | 57 | 24334.00 | 30 | | | | |
| 18 | Cull bulls | 1400 | Lbs. | .48 | 3.96 | 2661.12 | 3 | | | | |
| 19 | | | | | | | | | | | |
| 20 | Total Gross | | | | | 87195.12 | 100 | | | | |
| 21 | Gross per head | | | | | 290.65 | | | | | |
| 22 | OPERATING COSTS | | | | | | | | | | |
| 23 | Feed Costs | | | | | | | | | | |
| 24 | Hay for cows | 1.25 | Tons/cow | 50.00 | 300 | 18750.00 | 23 | | | | |
| 25 | Grain for cows | 0 | Tons/cow | 90.00 | 300 | .00 | 0 | | | | |
| 26 | Feed for calves | 0 | Tons/Hd. | 80.00 | 240 | .00 | 0 | | | | |
| 27 | Hay for horses, Total | | Tons | 75.00 | 3 | 225.00 | 0 | | | | |
| 28 | Pasture, Leased | | \$/Hd/Mon. | 12.00 | 0 | .00 | 0 | | | | |
| 29 | Range, Leased | | \$/Hd/Mon. | 5.00 | 0 | .00 | 0 | | | | |
| 30 | Priv. Range | | \$/Hd/Mon. | 5.00 | 0 | .00 | 0 | | | | |
| 31 | Priv. Ir. Pasture | | \$/Hd/Mon. | 12.00 | 300 | 18000.00 | 22 | | | | |
| 32 | | | | | | | | | | | |
| 33 | Total Feed Cost | | | | | 36975.00 | 44 | | | | |
| 34 | Feed Cost/Hd | | | | | 123.25 | | | | | |
| 35 | | | | | | | | | | | |
| 36 | Vet Med | | per cow | 12.00 | 300 | 3600.00 | 4 | | | | |
| 37 | Salt | | Lbs. | .05 | 33375 | 1668.75 | 2 | | | | |
| 38 | Labor, outside | | \$/cow | 24.00 | 300 | 7200.00 | 9 | | | | |
| 39 | Replacement Bulls | | Head | 1200.00 | 2.4 | 2880.00 | 3 | | | | |
| 40 | Pickup 4wd | | Miles | .30 | 15000 | 4500.00 | 5 | | | | |
| 41 | Pickup 2wd | | Miles | .20 | 5000 | 1000.00 | 1 | | | | |
| 42 | Tractor | | Hours | 5.00 | 50 | 250.00 | 0 | | | | |
| 43 | Stock trailer | | Miles | .01 | 15000 | 150.00 | 0 | | | | |
| 44 | Supplies | | \$/cow | 3.00 | 300 | 900.00 | 1 | | | | |
| 45 | Fence & Bldg. Rep. | | \$/cow | 2.00 | 300 | 600.00 | 1 | | | | |
| 46 | Farm Assoc. Dues | | Year | | | 300.00 | 0 | | | | |
| 47 | | | | | | | | | | | |
| 48 | Other Op. Costs (Non-feed Costs) | | | | | 23048.75 | 28 | | | | |
| 49 | Total Op. Costs | | | | | 60023.75 | 72 | | | | |
| 50 | Op. Costs/Head | | | | | 200.08 | | | | | |
| 51 | | | | | | | | | | | |
| 52 | FIXED COSTS | | | | | | | | | | |
| 53 | Insurance | | Percent | 1.00 | 60023.75 | 600.24 | 1 | | | | |
| 54 | Interest on Op. Costs | | Percent | 13.00 | 60023.75 | 3901.54 | 5 | | | | |
| 55 | Taxes | | \$/cow | 7.00 | 300 | 2100.00 | 3 | | | | |
| 56 | Land Payments | | \$/cow | 55.00 | 300 | 16500.00 | 20 | | | | |
| 57 | | | | | | | | | | | |
| 58 | Total Fix. Costs | | | | | 23101.78 | 28 | | | | |
| 59 | Fix. Cost/Head | | | | | 77.01 | | | | | |
| 60 | | | | | | | | | | | |
| 61 | TOTAL COSTS | | | | | 83125.53 | 100 | | | | |
| 62 | TOTAL COST/HEAD | | | | | 277.09 | | | | | |
| 63 | | | | | | | | | | | |
| 64 | INCOME OVER COSTS | | | | | 4069.59 | | | | | |
| 65 | INCOME PER HEAD | | | | | 13.57 | | | | | |

Cattle Ranch Economic Analysis¹

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Recently four local ranchers participated in a confidential ranch enterprise analysis. From that data which answered some questions for the individual ranches I have pulled out some average figures. While this was done in a manner not to breach the confidentiality, I can say the ranches represent both relative newcomers and longtime ranchers. The ranches ranged in size from about 125-130 cows up to just over 300 mother cows. There was a mixture of owned and leased land, with most hay produced by the ranch. Generally calves were sold as weaners with a small number kept and sold as yearlings. The individual ranch analyses were quite detailed but here a summary of the expenses incurred and averaged over the four ranches are presented.

The accompanying bar graph illustrates the categories of expenses that were considered and shows the amount spent in each category based or charged back to a single cow basis in the cow herd (the actual average cow herd size was 244 head). For example, the total transportation charges were divided by the number of cows to show the transportation charges per cow. Please note that for this "average" ranch there was, in addition to the 244 cows, replacement heifers, bulls and yearlings that brought the total inventory of livestock to 350 head (not counting calves with their dams).

The total expenses listed per cow are \$314 with the single largest expense being hay and representing nearly 30 % (over \$90 per cow) of the total expenses. This accounts for hay for the breeding herd, replacements, bulls and other supporting stock. Clearly, slight reductions in this area would have a much greater impact on reducing the total expense than in a smaller category.

Some possible considerations:

1. Avoid overfeeding and underfeeding. Know or seek advice on how much, and the quality of, feed needed at particular times. Consider "cheapening up" high quality feed with poorer quality and improving poor quality hay with alfalfa or grain. Costs of labor, equipment, storage and other factors will influence those options.

Ration balancing and least cost on-ranch commodities might significantly reduce the hay budget by better balancing the available feeds.

2. How much is that hay really costing? Roger Benton, Crops Farm Advisor suggests costs to produce hay vary from \$93.50 for alfalfa (including stand establishment and 6 year life), \$75 for grain hay and \$85 for grass hay. This is not for all new equipment but a mixture of old, older and not so old equipment. Frequently hay can be purchased for less than

this, especially hay that may be slightly damaged but adequate for stock hay. On an item this large even a small savings can be quite significant.

3. What can be done to reduce the hay feeding period and consequently the hay bills. Possibilities include increased grazing in late fall and/or early spring turnout; perhaps alfalfa stubble, special south slopes or lower elevations. Can range or pasture forage be saved from spring or summer grazing and used in the fall instead of hay. Seeding certain fields to wheatgrass for later season grazing might be worthwhile. Annual legumes such as rose clovers are looking promising as late forage of high quality.

4. Intensive grazing management, as discussed at the cattle tour this year, may have a role in better utilization of cattle harvested forage compared to running equipment over the land.

The second largest expense, at 14% of the total, consisted of hired labor, insurance, FICA, Compensation and other benefits for the employee and employer. Actual salary for the owner was not included here, however, owner benefits such as insurance were included. It was not possible to allocate the costs of labor to each specific activity but certainly some of the labor costs were associated with feeding hay and pasturing cattle, along with irrigating, fencing etc.

Costs for leased pasture and range were the third largest expense, at 12 % of the total expense. Keep in mind the cost for owned land would be in land payments, water and power, fencing on private land and those types of cost related to land ownership.

It is of interest to consider the veterinary costs. Only a very small amount (3%), as a percentage of the total, was spent as an average in that category. Considering that animal health losses or reduced performance can have dramatic and tremendously large effects, and that even halving the expenditures would not amount to a large dollar savings, with catastrophic results possible. It may be best to be cautious and "buy a little extra insurance" in terms of veterinary care.

While these numbers are averages and as such don't apply to any specific situation, I think they can illustrate areas to change that may reduce expenditures with a minimum of detrimental effects on income. An interesting analogy exists with some growers turning off the water to alfalfa. It was often done in response to high power costs and an attempt to reduce expenses which is understandable. However, Roger Benton investigated the effects of various levels of water deprivation on alfalfa yield. He found some reduction in applied water caused only slight decreases in yield and likely would be effective in reducing expenses more than the decrease in income. However when applied water was drastically reduced, the yields suffered so badly that actually more money was lost. That's what I call going from the frying pan into the fire!

After completing a number of economic analysis, there are fairly significant differences between ranches that require specific actions for specific individuals. However in all cases there are areas where actions will be most beneficial as the example of the "average" illustrates.

Legend for Categories of Expenses

| # | Category | \$/cow | % of Total |
|----|---|----------|------------|
| 1 | Hay needed for all stock | \$91.25 | 29% |
| 2 | Labor, Ins, FICA, Comp, Etc. | \$44.89 | 14% |
| 3 | Leased pasture & range plus water costs | \$36.53 | 12% |
| 4 | Bulls and Cows Purchased | \$25.57 | 8% |
| 5 | Fertilizer | \$23.68 | 8% |
| 6 | Power and Electricity | \$21.19 | 7% |
| 7 | Repair and Maintenance | \$18.72 | 6% |
| 8 | Gas, Propane and Fuel | \$16.79 | 5% |
| 9 | Interest on Operating Capital | \$15.11 | 5% |
| 10 | Veterinary Medicine | \$ 8.63 | 3% |
| 11 | Total purchased supplements | \$ 6.45 | 2% |
| 12 | Office and Misc. | \$ 5.27 | 2% |
| 13 | Livestock Transportation | \$ 1.25 | .5% |
| | | \$314.46 | |

*Some rounding of numbers has occurred.

Distribution of Expenses for Cow/Calf Ranch

Average of 4 ranches, 250 cow herd size



