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DFBS Expert System For Analyzing Dairy Farm Businesses

Users' Guide for Version 4.0

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INTRODUCTION

An expert system is a computer program that analyzes a situation based on available facts and gives recommendations equivalent to an expert's advice. In the Dairy Farm Business Summary (DFBS) Expert System the available facts are DFBS data and the experts are farm management faculty in the Department of Agricultural, Resource, and Managerial Economics. New York dairy farmers and Cooperative Extension Agents and specialists use the DFBS Expert System as a tool to assist in analyzing the financial and production performance of dairy farm businesses.

The DFBS Expert System Version 4.0 is to be used in conjunction with the Dairy Farm Business Summary generated by Micro DFBS Version 3.0.[1] The DFBS Expert System is a Lotus 1-2-3 spreadsheet developed by Darwin Snyder, former Research Associate in the Department of Agricultural, Resource, and Managerial Economics. The Lotus 1-2-3 electronic spreadsheet software package (Version 2.2 or later) or compatible software and the Micro DFBS computer program are required to run the DFBS Expert System.

GETTING STARTED

The input data used by the DFBS Expert System is generated by Micro DFBS Version 3.0. To make the data file, select "Calculate and Print" from the main menu of Micro DFBS and enter the farm number. You are then asked for the output device. Type "F" for File. Then type "V" for Convert. The file <farm no> XP.PRN will be created and stored in the same disk drive and directory as your other 1993 DFBS data files. Repeat this process for all completed DFBS files. Quit the Micro DFBS program.

The files <farm no.>XP.PRN must be on a disk in your A: drive for the DFBS Expert System to work properly. Copy all .PRN files to a floppy disk. For example, if your DFBS data are stored on the hard disk in a c:\dfbs\dfbsdata directory, you would type the following to copy the files to a formatted floppy disk in drive A:

cd\dfbs\dfbsdata <enter>
*copy *.prn A: <enter>*

Copy the DFBS Expert System file to your hard disk. There are two versions of the DFBS Expert System. XP4FOR93.WK1 is designed to work with dot matrix printers. XP4LASER.WK1 is designed to work with laser printers. Copy the appropriate file to your Lotus 1-2-3 directory on your hard disk. For example, if you have the file XP4LASER.WK1 on a floppy in drive A:, and the Lotus 1-2-3 program in a \123 directory type the following:

cd\123<enter>
copy a:XP4LASER.WK1 <enter>

USING THE DFBS EXPERT SYSTEM

Start the Lotus 1-2-3 software package. Load the DFBS Expert System by typing /FR (or select "File" and "retrieve" from the Lotus menus). Select the DFBS Expert System from the list of filenames, either XP4LASER or XP4FOR93.

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[1]Putnam, Linda D., Wayne A. Knoblauch, and Stuart F. Smith, Micro DFBS, A Guide to Processing Dairy Farm Business Summaries in County and Regional Extension Offices for Micro DFBS Version 3.0. A.E. Ext. 94-02, January 1994.

After the spreadsheet is loaded you will see the first instruction screen below. The example farm, Danielle Dairyperson (farm no. 46004), is displayed.

```
XP4FOR93.WK1   Revised:          January 28, 1994
               Enter date used: January 28, 1994

Purpose:        EXPERT SYSTEM FOR ANALYZING DAIRY FARM BUSINESSES
Developed by:   D.P. Synder:  Update by:  L.D. Putnam, Cornell University
Year:           1993

PROCEDURE:

Step 1.      Enter the date this program is used in cell G2, above

Step 2.      Insert a disk with the converted DFBS files in the A: drive.
             Type ALT I to import data from previously converted DFBS file.
             Select the desired farm file with the cursor and type "ENTER".

Step 3.      Enter the farmer's name,  if desired --->Danielle Dairyperson

Step 4.      The file you have selected is for farm ---->46004.

             (Tab right one screen to continue)
```

Change the default file directory to the A: drive. Insert the disk with the <farm no.>XP.PRN files in the A: drive and type:

/fd a:<enter>

Proceed with Steps 1 through 4 as instructed on the screen. For Step 2, hold down the <ALT> key while typing the letter "i". Step 4 displays the farm number of the file you imported in Step 2. Press <TAB> to move to the second instruction screen, shown below:

PROCEDURE (continued)

Step 5. Based on the number of cows and barn type, the "Type" number that best describes this farm is ----4

Type 1. Small Conventional Stall Farms (60 cows or less) (ALT A)
Type 2. Large Conventional Stall Farms (over 60 cows) (ALT B)
Type 3. Small Free Stall Farms (120 cows or less) (ALT C)
Type 4. Small Free Stall Farms (over 120 cows) (ALT D)

Step 6. You may want to copy Step 7 for reference; it cannot be seen while the program is running.

Step 7. Press ALT A, B, C, or D, depending on your farm "Type" number.
- The program will pause for you to check data for this farm.
- Use the up and down arrow keys to sight verify the data.
- Type "ENTER" when you are done checking the data.
- Press ALT P to print the report.

Go back to Step 2. (Press "HOME" key) to continue with the next farm.

End of procedure

Proceed with Steps 5 through 7. Step 5 displays the farm type based on the number of cows and barn type. You may skip Step 6 since Step 7 is shown above. Step 7 instructs you to type <ALT>A, <ALT>B, <ALT>C, or <ALT>D depending on the type of farm (hold down the <ALT> key while typing the letter). If you wish to check the data, use the cursor keys (up and down arrows). Press <enter> to return to the instruction screen. Press <ALT>P to print the report.

Repeat steps 2 through 7 for all the farms.

It is not recommended that you save the spreadsheet for each farm as the file is quite large and will use up your hard disk space. If you need to reprint a DFBS Expert System for a farm, repeat steps 2 through 7.

In some instances you may want to compare the farm to a different group "type" than what is indicated in cell R4. For example, if a freestall farm averaged 121 cows, you may want to print a DFBS Expert System that compared the farm data to the small freestall group of farms as well as the large freestall group. Do this by typing the appropriate number (1-4) in cell R4 and then press Alt A, B, C, or D. In this example type a "3" to compare to the small freestall group of farms and then press Alt C. DO NOT SAVE THIS WORKSHEET OR THE FORMULA IN CELL R4 WILL BE LOST. You need to reload the original worksheet at this point in order to continue with other farms.

A sample DFBS Expert System Analysis Report follows:

EXPERT SYSTEM FOR ANALYZING DAIRY FARM BUSINESSES
1993 DAIRY FARM BUSINESS SUMMARY

Large Free Stall Farms (over 120 cows)

Farm No. 46004 Danielle Dairyperson February 7, 1994

COMPARISON OF YOUR FARM BUSINESS
with similar farms in 1991 and 1992

SELECTED FACTORS:	(Factor for "Your farm" is from page 1 of DFBS output except as noted.)	84 farms in 1991	84 farms in 1992	Your farm 1993
SIZE OF BUSINESS				
Average number of cows		250	279	170
Average number of heifers		206	213	101
Milk sold, lbs.		4707816	5421782	2500000
Worker equivalent		6.40	6.83	4.67
Total tillable acres		658	675	450
RATES OF PRODUCTION				
Milk sold per cow, lbs.		18812	19469	14706
Hay dry matter per acre, tons		2.6	3.1	3.5
Corn silage per acre, tons		14	15	16.7
LABOR EFFICIENCY				
Cows per worker		39	41	36
Milk sold per worker, lbs.		736003	794151	535714
COST CONTROL				
Grain & concentrate expense as % milk sales		29%	27%	26
Dairy feed & crop expense per cwt. milk		$ 4.65	$ 4.62	$ 4.49
Machinery costs per cow (page 11 of DFBS)		$ 428	$ 412	$ 478
CAPITAL EFFICIENCY (average for year)				
Farm capital per cow		$ 6296	$ 6012	$ 5469
Machinery and equipment per cow		$ 1083	$ 997	$ 1208
Asset turnover ratio		0.48	0.54	0.43
PROFITABILITY (rates of return, page 3 of DFBS)				
Net farm income without appreciation		$ 58491	$ 105301	$ 32000
Net farm income with appreciation		$ 93251	$ 137650	$ 52705
Labor & management income per operator/mgr		$ 4891	$ 31312	$ -4829
Return on equity capital without appreciation		1.1%	5.5%	-2.0
Return on all capital without appreciation		3.9%	6.0%	4.3
COST OF PRODUCING MILK (page 10 of DFBS)				
Operating cost of producing milk per cwt.		$ 10.55	$ 10.61	$ 10.01
Purchased inputs cost of producing milk per cwt.		$ 11.86	$ 11.74	$ 11.39
Total cost of producing milk per cwt.		$ 13.89	$ 13.59	$ 14.02
Milk receipts per cwt.		$ 13.10	$ 13.68	$ 12.67

Note: Business analyses generated through the use of this expert system are dependent upon the accuracy of the individual farm data submitted. Analyses are provided to assist the manager in making decisions regarding future management actions to improve the business. Cornell University and Cornell Cooperative Extension do not assume responsibility for decisions made by farmers.

February 7, 1994 ANALYSIS REPORT Farm no. 46004 Page 2

COMPARISONS OF KEY FACTORS FOR YOUR FARM WITH TOP PERFORMERS AND GROUP AVERAGES FOR:
84 Large Free Stall Farms (over 120 cows)

Factors	1992 Top * performers	1992 Group average	1993 Your farm	Comparative evaluation
YIELDS:				
Milk per cow, pounds	21897	19469	14706	Poor
Hay, tons DM per acre	4.3	3.1	3.5	Very Good
Corn silage, tons per acre	20.1	14.9	16.7	Very Good
LABOR EFFICIENCY:				
Cows per worker	48	41	36	Fair
Milk per worker, lbs.	878680	794151	535714	Poor
COST CONTROL:				
Feed & crop expenses/cwt	$4.01	$4.62	$4.49	Very Good
Machinery cost per cow	$363	$412	$478	Good
CAPITAL EFFICIENCY:				
Asset turnover ratio	0.55	0.54	0.43	Good
Machinery invested per cow	$910	$997	$1,208	Fair
COST OF PRODUCING MILK:**				
Operating cost per cwt.	$7.82	$10.61	$ 10.01	Very Good
Purchased inputs cost per cwt.	$9.17	$11.74	$ 11.39	Very Good
Total cost per cwt.	$12.62	$13.59	$ 14.02	Poor
PROFITABILITY:				
Rate return on equity without appreciation	11.8%	5.5%	-2.0	Fair
Rate return on all capital without appreciation	9.6%	6.0%	4.3	Good
Labor & management income per operator	$72,528	$31,312	$ -4829	Fair

*The top performer average is calculated independently for each factor. It is the average of 20 percent of all farms with the highest yield, labor efficiency and profitability factors. It is the average of one half of all farms with the lowest cost control and capital efficiency factors, and 25 percent of all farms with the lowest cost of producing milk.

**The cost of producing milk used in this expert system is calculated as total farm costs minus all non-milk receipts. The basis for this procedure is the assumption that all non-milk receipts were produced at a cost equal to their sale value.

"Total cost of producing milk" includes the cost of all resources used in the production of milk. "Purchased inputs cost of producing milk" does not include the unpaid family labor or the value of operator labor and management, and equity capital. "Operating costs" also exclude depreciation.

The comments below compare your farm to averages for:
84 Large Free Stall Farms (over 120 cows)

(Also, see page 2 for comparison with top performers.)

YIELDS -
Cows: 14706 lbs. sold per cow which is Poor

- Herd average is a major weak point in the business. Over 60% of herds on similar farms have higher averages. A major effort is needed to improve: feeding practices - check for ration imbalance; breeding practices - check days dry and conception rates; herd health and milking practices.

FACTORS THAT MAY AFFECT HERD AVERAGE:
Feed & crop expense/cwt.: $4.49 per cwt. which is Very Good
- Feed & crop expense per cwt is lower than the average of similar farms. Continue efforts to control crop input costs and improve forage quality by timely harvest.

Crop yields - Hay: 3.5 tons DM per acre which is Very Good
- Average or low hay yields indicate the herd may not be receiving enough high quality forage to support higher production. Higher yields will also help reduce feed costs.

Crop yields - Corn silage: 16.7 tons/acr which is Very Good
- Average or low corn silage yields may indicate your herd may not be receiving enough high quality forage to support higher production. Higher yields will also help reduce feed costs.

Hay: 3.5 tons DM per acre which is Very Good

- Unless soil type is a limiting factor or you experienced adverse weather, you should be able to improve yields. Maintain proper pH for the crop grown, test soil before seeding or at least every three years & fertilize per Cornell recommendations. Improve stand establishment & management.

Corn silage: 16.7 tons per acre which is Very Good

- Unless soil type is a limiting factor or you experienced adverse weather, you should be able to improve yields. Improve weed control, plant population, timeliness of cutting and variety selection. Test soil and follow Cornell recommendations.

LABOR EFFICIENCY -

Cows per worker: 36 cows per worker which is Fair

- Your labor efficiency is below average for similar farms and needs to be improved. Unless you use substantial labor on non-dairy enterprises, the inefficiency may be caused by poor cow handling design, obsolete facilities/equipment, or ineffective labor management practices. Find ways to improve cow traffic patterns and worker motivation.

Milk sold per worker: 535714 #/worker which is Poor

- This factor is significantly below average for similar farms. See comments under YIELDS for milk production per cow. See also comments under LABOR EFFICIENCY for cows per worker. Improving these factors will increase milk sold per worker.

COST CONTROL -

Feed & crop expenses/cwt milk: $4.49 per cwt. which is Very Good

- These costs are low compared to similar farms. Continue to refine ration balancing and crop production practices to maintain control of these costs.

Machinery costs per cow: $478 per cow which is Good

- This factor is about average for similar farms. Pay special attention to labor management practices and equipment use to encourage efficient use of both.

COST OF MILK PRODUCTION

Your total cost of producing milk is estimated to be $ 14.02 per cwt. Your average milk price is $12.67 , leaving a return over total costs of $ -1.35 .

- Your total cost of producing milk is above the average of that for other Dairy Farm Business Summary cooperators. You are receiving returns on your own resources less than the 5 percent charged for equity capital and the value you placed on operator labor and management. To obtain reasonable rates of return on your labor and management and become competitive with other producers, you need to take steps to lower your total cost of producing milk per cwt.

Your average milk price, $12.67 , compared to your purchased inputs cost of producing milk of $11.39 , leaves a margin of $1.28 for your operator-supplied resources and unpaid family labor.

- Your purchased inputs cost of producing milk is near or below the average for other Dairy Farm Business Summary cooperators. It is also below your average milk price, leaving a return for unpaid family labor and operator labor, management and equity capital. To keep up with your competition and increase the return to these resources, you should strive to lower your cost of producing milk.

Your operating cost of producing milk, not including depreciation, unpaid family labor, operator labor & management, and equity capital, was $ 10.01 . Your average milk price was $12.67 , leaving the return of $ 2.66 to cover depreciation, unpaid family labor, and operator-supplied resources.

- Your operating cost of producing milk is well below the average for other Dairy Farm Business Summary cooperators. Keep up the good work, but check to see that non-operating costs are not excessive. Attempt to continue to strive to reduce operating costs.

NET COSTS OF PRODUCING MILK PER HUNDREDWEIGHT Farm no 46004 Page 6
Comparisons for your farm with group averages for:
84 Large Free Stall Farms (over 120 cows)

Category		1992 Group average		1992 Your farm	Deviation
Dairy grain and concentrate		$ 3.75	$	3.28	
Total feed expense		3.86		3.38	$ -0.48
Crop expense		0.77		1.11	
- Crop sales and government receipts*	-	0.54	-	0.77	
Net Feed and Crop Expense		$ 4.09	$	3.71	$ -0.38
Hired labor		2.24		1.71	
Operator's and family labor		0.96		1.67	
Total Labor Expense		$ 3.20	$	3.38	$ 0.18
Machine repairs, fuel, and hire		1.23		1.89	
Machinery depreciation		0.63		0.96	
- Gas tax refunds and custom work	-	0.03	-	0.19	
Net Machinery Expense		$ 1.83	$	2.65	$ 0.82
Replacement and expansion cattle purchased		0.65		0.02	
- Sales and inventory growth	-	1.58	-	1.44	
Net Cattle Purchases		$ -0.93	$	-1.42	$ -0.49
Milk marketing costs		0.58		0.25	
All other livestock exp. excluding purchases		1.24		0.71	
Net Livestock Expenses		$ 1.82	$	0.97	$ -0.85
Real estate repairs, rent, and taxes		0.77		0.56	
Building depreciation		0.50		0.42	
Total Real Estate Expense		$ 1.27	$	0.98	$ -0.29
Interest paid		0.86		2.00	
Interest on equity		0.90		0.96	
Total Interest Expense		$ 1.76	$	2.96	$ 1.20
Other operating expenses		0.72		0.78	
- Miscellaneous income	-	0.17	-	0.00	
Net Miscellaneous Expenses		$ 0.55	$	0.78	$ 0.23
Total Cost of Producing Milk		$ 13.59	$	14.02	$ 0.43
Purchased Inputs Cost of Producing Milk**		$ 11.74	$	11.39	$ -0.35
Total Operating Cost of Producing Milk		$ 10.61	$	10.01	$ -0.60

* Non-crop related government payments may produce irregular results.
** Total cost excluding unpaid family labor and the opportunity costs of the operator's labor, management, and equity capital.

HOW THE DFBS EXPERT SYSTEM WORKS

Page 1 of the DFBS Expert System Analysis Report compares the individual farm data to a group average for the last 2 years. The group averages are from farms with similar size and barn types. The four groups of farms are:

a) small conventional stall farms with 60 or less cows and a stanchion barn;

b) large conventional stall farms with more than 60 cows and a stanchion barn;

c) small freestall farms with 120 or less cows and a freestall barn;

d) large freestall farms with more than 120 cows and a freestall barn.

Page 2 compares selected factors from the individual farm with the group averages. There is also a comparison to the group of farms (top performers) that ranked the highest for these factors. The "top performers" are based on data from all farms.

A comparative evaluation is done for each of the factors ranging from Poor to Excellent. The comparative evaluations are based on the individual farm data's rank by decile when compared to the decile averages of the group. For example, if the milk production per cow for a large freestall farm was 14,706 pounds, this factor would have a decile ranking of 10 (see Table 4.) The factor is closest to the lowest average decile group for large freestall farms. This farm would then have a comparative evaluation of "poor" for the milk per cow factor, since rankings of 9 - 10 are defined as "poor" (see Table 5).

Table 1

1992 DFBS FARM BUSINESS CHART*
99 Small Conventional Stall Farms, 1992

	Yields			Labor Efficiency		Cost Control	
Decile	Pounds Milk sold Per Cow	Tons Hay Crop DM/Acre	Tons Corn Silage Per Acre	Cows Per Worker	Pounds Milk sold Per Worker	Feed & Crop Expenses Per Cwt.	Machinery Costs Per Cow
1	21,382	3.7	22	46	760,933	$3.20	$ 251
2	19,969	3.1	18	36	627,590	3.78	304
3	19,389	2.9	16	30	540,690	4.12	352
4	18,540	2.6	15	27	492,638	4.34	396
5	18,160	2.4	15	26	454,994	4.52	437
6	17,523	2.2	13	24	427,601	4.73	470
7	16,512	2.1	12	23	400,809	4.95	506
8	15,520	1.9	12	22	369,048	5.33	545
9	14,121	1.6	10	20	323,957	5.90	599
10	11,563	1.2	4	16	241,563	6.88	867

	Capital Efficiency		Cost of Producing Milk			Profitability		
	Asset	Machinery	Operating	Input	Total	Rate Return without appreciation on:		Labor &
Decile	Turnover Ratio	Investment Per Cow	Cost Per Cwt.	Cost Per Cwt.	Cost Per Cwt.	Equity Cap.	All Cap.	Mgt. Income Per Oper.
1	0.60	$ 534	$ 6.56	$ 8.29	$ 12.90	7.1%	6.9%	$ 23,678
2	0.50	791	8.05	9.55	14.03	2.5	4.2	14,168
3	0.47	936	8.52	10.02	14.70	0.6	2.6	9,493
4	0.44	1,102	9.30	10.60	15.40	-1.1	1.0	4,888
5	0.41	1,237	9.88	11.19	16.05	-3.7	-0.3	1,521
6	0.37	1,391	10.38	11.74	16.43	-5.9	-1.4	-2,983
7	0.34	1,646	10.84	12.28	16.83	-9.1	-3.4	-7,798
8	0.31	1,823	11.31	12.90	17.59	-13.4	-4.6	-13,240
9	0.27	2,080	12.23	13.59	19.38	-19.7	-6.7	-19,918
10	0.21	2,766	13.66	15.95	23.90	-37.4	-13.8	-38,585

*Each column of the chart is independent of the others. The farms which are in the top 10 percent for one factor would not necessarily be the same farms which make up the top 10 percent for any other factor.

Table 2

1992 DFBS FARM BUSINESS CHART
86 Large Conventional Stall Farms, 1992

	Yields			Labor Efficiency		Cost Control	
Decile	Pounds Milk sold Per Cow	Tons Hay Crop DM/Acre	Corn Silage Per Acre	Cows Per Worker	Pounds Milk sold Per Worker	Feed & Crop Expenses Per Cwt.	Machinery Costs Per Cow
1	22,871	5.0	23	48	876,546	$3.02	$223
2	20,905	3.6	19	37	724,109	3.60	316
3	20,106	3.2	17	34	641,723	3.79	369
4	19,342	2.9	17	32	592,104	4.04	412
5	18,385	2.7	16	31	563,811	4.41	426
6	17,845	2.5	15	29	512,314	4.64	447
7	17,054	2.2	13	27	467,326	4.93	489
8	16,373	2.0	12	25	430,539	5.19	523
9	15,006	1.8	10	24	397,414	5.60	563
10	12,535	1.4	7	21	352,630	6.51	718

	Capital Efficiency		Cost of Producing Milk			Profitability		
	Asset	Machinery	Operating	Input	Total	Rate Return without appreciation on:		Labor &
Decile	Turnover Ratio	Investment Per Cow	Cost Per Cwt.	Cost Per Cwt.	Cost Per Cwt.	Equity Cap.	All Cap.	Mgt.Income Per Oper.
1	0.61	$ 613	$ 6.72	$7.96	$11.87	12.1%	10.1%	$ 43,558
2	0.53	916	7.90	9.41	12.73	8.0	7.5	28,599
3	0.48	1,004	8.52	9.95	13.29	5.0	5.6	23,048
4	0.45	1,102	9.10	10.37	13.68	3.4	4.3	18,555
5	0.42	1,296	9.66	10.97	14.21	1.6	2.9	9,783
6	0.40	1,397	10.37	11.67	14.75	-0.1	1.8	4,808
7	0.37	1,491	10.88	12.09	15.42	-1.7	1.1	-1,813
8	0.34	1,688	11.34	12.73	15.91	-3.7	-0.3	-7,608
9	0.31	1,978	11.76	13.20	16.56	-7.0	-1.6	-17,446
10	0.24	2,637	12.91	14.35	18.29	-24.2	-6.5	-43,084

Table 3

1992 DFBS FARM BUSINESS CHART
59 Small Freestall Farms, 1992

	Yields			Labor Efficiency		Cost Control	
Decile	Pounds Milk sold Per Cow	Tons Hay Crop DM/Acre	Corn Silage Per Acre	Cows Per Worker	Pounds Milk sold Per Worker	Feed & Crop Expenses Per Cwt.	Machinery Costs Per Cow
1	23,226	5.7	21	53	872,689	$3.36	$ 264
2	20,742	3.9	19	42	770,827	3.83	376
3	20,075	3.4	18	37	688,683	4.24	406
4	19,485	3.2	16	34	603,386	4.50	448
5	18,584	2.9	15	32	571,158	4.83	490
6	18,036	2.6	14	29	538,989	5.10	538
7	17,504	2.3	12	27	488,313	5.26	592
8	16,043	2.0	10	25	433,176	5.56	644
9	13,200	1.8	8	23	360,361	6.29	692
10	11,685	1.3	3	15	270,409	6.91	875

	Capital Efficiency		Cost of Producing Milk			Profitability		
	Asset	Machinery	Operating	Input	Total	Rate Return without appreciation on:		Labor &
Decile	Turnover Ratio	Investment Per Cow	Cost Per Cwt.	Cost Per Cwt.	Cost Per Cwt.	Equity Cap.	All Cap.	Mgt. Income Per Oper.
1	0.71	$ 679	$ 6.33	$ 8.02	$ 11.89	13.3%	11.0%	$ 51,557
2	0.59	942	8.39	10.13	13.23	5.2	5.8	22,625
3	0.50	1,050	9.37	10.77	14.13	1.3	3.7	10,907
4	0.46	1,166	9.78	11.17	14.97	-0.5	2.0	6,110
5	0.44	1,369	10.13	11.69	15.66	-1.7	0.9	1,978
6	0.40	1,534	10.57	12.21	16.07	-3.6	0.0	-689
7	0.38	1,723	11.17	12.57	16.67	-5.4	-1.6	-4,932
8	0.35	1,954	11.72	13.32	17.68	-8.5	-3.0	-15,149
9	0.31	2,221	12.99	14.71	18.98	-12.8	-4.9	-26,857
10	0.26	3,121	14.79	16.77	20.47	-40.8	-10.0	-65,994

Table 4

1992 DFBS FARM BUSINESS CHART
84 Large Free Stall Farms, 1992

		Yields		Labor Efficiency		Cost Control	
Decile	Pounds Milk sold Per Cow	Tons Hay Crop DM/Acre	Corn Silage Per Acre	Cows Per Worker	Pounds Milk sold Per Worker	Feed & Crop Expenses Per Cwt.	Machinery Costs Per Cow
1	22,717	5.0	21	60	1,138,851	$ 3.19	$ 259
2	21,818	4.1	18	47	899,158	3.86	320
3	21,355	3.6	17	44	845,337	4.17	366
4	20,495	3.3	16	42	805,033	4.41	397
5	19,777	3.0	16	40	760,845	4.55	421
6	19,160	2.8	15	37	731,079	4.70	441
7	18,228	2.6	14	35	690,044	4.90	479
8	17,535	2.4	13	33	647,088	5.12	513
9	16,783	2.2	11	31	598,697	5.44	553
10	14,619	1.8	7	27	492,796	6.23	691

	Capital Efficiency		Cost of Producing Milk			Profitability		
Decile	Asset Turnover Ratio	Machinery Investment Per Cow	Operating Cost Per Cwt.	Input Cost Per Cwt.	Total Cost Per Cwt.	Rate Return without appreciation on: Equity Cap.	All Cap.	Labor & Mgt. Income Per Oper.
1	0.81	$ 477	$ 7.56	$ 8.77	$ 11.30	22.0%	14.3%	$ 266,126
2	0.67	637	8.92	10.03	12.22	12.3	10.0	78,676
3	0.61	758	9.56	10.80	12.99	9.1	8.1	43,360
4	0.55	879	10.27	11.46	13.36	6.1	6.3	33,386
5	0.51	985	10.82	11.76	13.66	3.6	5.3	21,848
6	0.49	1,067	11.10	12.10	13.92	1.4	4.1	10,659
7	0.47	1,185	11.30	12.34	14.55	-1.3	2.1	-1,813
8	0.42	1,375	11.65	13.04	15.37	-3.6	0.5	-12,922
9	0.38	1,641	12.24	13.55	16.26	-7.1	-1.5	-34,149
10	0.32	2,154	13.58	14.83	17.28	-21.2	-4.2	-79,753

Table 5

DFBS EXPERT SYSTEM
Comparative Evaluation Definitions

Factor	Comparative Evaluation				
	Excellent	Very Good	Good	Fair	Poor
	Decile Rank				
YIELDS:					
Milk per cow	1-2	3-4	5-6	7-8	9-10
Hay, tons DM/acre	1-2	3-4	5-6	7-8	9-10
Corn silage, tons/acre	1-2	3-4	5-6	7-8	9-10
LABOR EFFICIENCY:					
Cows per worker	1-2	3-4	5-6	7-8	9-10
Milk per worker, lbs.	1-2	3-4	5-6	7-8	9-10
COST CONTROL:					
Feed & crop expense/cwt.	1-2	3-4	5-6	7-8	9-10
Machinery cost per cow	1-2	3-4	5-6	7-8	9-10
CAPITAL EFFICIENCY:					
Asset turnover ratio	3-5	2,6,7	1&8	9	10
Machinery investment/cow	2-3	4-5	1&6	7-8	9-10
COST OF PRODUCING MILK:					
Operating costs	1-2	3-4	---	5-10*	5-10**
Purchased input costs	1*	1**,2-5*	2-5**	6-10*	6-10**
Total costs	1*	1**,2-5*	2-5**	6-10*	6-10**
PROFITABILITY:					
Rate return on all capital w/o apprec.	1-2	3-4	5-6	7-8	9-10
Rate return on equity w/o apprec.	1-2	3-4	5-6	7-8	9-10
Labor & mgt. income/op.	1-2	3-4	5-6	7-8	9-10

*When this cost of producing milk is less than the milk price.
**When this cost of producing milk is greater than the milk price.

Pages 3 through 5 of the DFBS Expert System Analysis Report again lists selected factors for the farm and the comparative evaluations. The comment printed on the report is based on the decile ranking of the factor. One comment may be used for more than one decile group. Also included are comments to the farm manager from an "expert" for each of the factors. The complete list of possible comments are listed below:

The comment menu: YIELDS

Cows: Milk sold per cow, lb.

Decile: 1,2 -
Your herd average is a major strength. It ranks among the top 20% for similar farms. Increases may be possible with improvements of herd management practices. Be sure efforts to improve production cost less than added returns.

Feed & crop expense per cwt-

Decile: 1-5 -
Your feed & crop expense per cwt is lower than the average of similar farms. This indicates excellent cost control and feed utilization considering your herd average.

Decile: 6-10 -
Your feed & crop expense per cwt is higher than the average of similar farms. Take steps to reduce feed expenses, crop input costs and increase crop yields while maintaining high milk production.

Crop yields - Hay:

Decile: 1-3 -
This is a good combination of high production per cow and high hay yields as long as costs are controlled for both. Maintain high quality hay crop for continued high production per cow.

Decile: 4-10 -
Continue to improve hay yield to reduce cost of feed and increase supply of quality hay crop to maintain or improve your excellent herd average.

Crop yields - Corn silage:

Decile: 1-3 -
This is a good combination of high production per cow and high corn silage yields as long as costs are controlled for both. Maintain high quality silage for continued high production per cow.

Decile: 4-10 -
Continue to improve corn silage yields to reduce feed costs and increase the supply of quality silage to maintain or improve your excellent herd average.

Decile: 3,4 -
Your herd average is above average for similar farms. Production gains are possible with further efforts to improve ration balance, conception rate, and feeding & milking practices.

Feed & crop expense per cwt-

Decile: 1-5 -
Feed & crop expense per cwt is lower than the average of similar farms. Strive to increase crop yields and improve quality to help improve production per cow.

Decile: 6-10 -
Feed & crop expense per cwt is higher than the average of similar farms. Take steps to reduce crop input costs and increase crop yields and quality.

Crop yields - Hay:

Decile: 1-3 -
Maintain excellent hay yield and quality to assure adequate supply of low cost nutrients to help improve production per cow.

Decile: 4-10 -
Improve hay crop yields and quality to control feed costs and increase production per cow.

Crop yields - Corn silage:

Decile: 1-3 -
Maintain excellent corn silage yield and quality to assure adequate supply of low cost nutrients to help improve production per cow.

Decile: 4-10 -
Improve corn silage yields and quality to control feed costs and increase production per cow.

Decile: 5,6 -
Herd average is about average for similar farms. You should benefit from efforts to improve your feeding, reproduction, herd health, and milking practices. It's important to increase your herd average. (Same choice of comments on Feed & crop exp/cow and crop yields as for herd average deciles 3 & 4 above.)

Decile: 7-10 -
Herd average is a major weak point in the business. Over 60% of herds on similar farms have higher averages. A major effort is needed to improve: feeding practices-check for ration imbalance; breeding practices - check days dry and conception rates; herd health and milking practices.

Feed & crop expense per cwt-

Decile: 1-5 -
Feed & crop expense per cwt is lower than the average of similar farms. Continue efforts to control crop input costs and improve forage quality by timely harvest.

Decile: 6-10 -
High feed & crop expense per cwt and low production per cow is a poor combination. Take steps to reduce crop input costs, improve forage quality, purchase high quality but economical feed, balance the total ration and follow recommended feeding practices.

Crop yields - Hay:

Decile: 1-3 -
Maintain excellent hay yield. Be sure hay quality is high and dairy ration is balanced and plentiful to support a major improvement in production per cow.

Decile:4-10 -
Average or low hay yields indicate the herd may not be receiving enough high quality forage to support higher production. Higher yields will also help reduce feed costs.

Crop yields - Corn silage:

Decile: 1-3 -
Maintain your excellent corn silage yield. Be sure silage quality is high and dairy ration is balanced and plentiful to support a major improvement in production per cow.

Decile:4-10 -
Average or low corn silage yields may indicate your herd may not be receiving enough high quality forage to support higher production. Higher yields will also help reduce feed costs.

Hay: DM produced per acre, tn.

Decile: 1-3 -
Your hay crop yield is well above average. Yield is not a weakness in your hay enterprise. Continue to evaluate management practices to further improve yields. Strive for optimum timeliness of harvest.

Decile:4-10 -
Unless soil type is a limiting factor or you experienced adverse weather, you should be able to improve yields. Maintain proper pH for the crop grown, test soil before seeding or at least every three years & fertilize per Cornell recommendations. Improve stand establishment & management.

Corn silage produced per acre, tn.

Decile: 1-3 -
Your corn silage yield is well above average. Continue to evaluate management practices to further improve yields. Strive for optimum timeliness of harvest.

Decile:4-10 -
Unless soil type is a limiting factor or you experienced adverse weather, you should be able to improve yields. Improve weed control, plant population, timeliness of cutting and variety selection. Test soil and follow Cornell recommendations.

The comment menu: LABOR EFFICIENCY

Cows per worker, no.

Decile: 1-2 -
If you raise all your replacements and roughage, cows per worker is well above average for similar farms. This factor is affected by labor requirements for enterprises other than cows, cow handling design and equipment, and labor management practices. Be sure capital efficiency factors are reasonable.

Decile: 3-4 -
If you raise all your replacements and roughage, cows per worker is above average for similar farms. This factor is affected by labor requirements for enterprises other than cows, cow handling design and equipment, and labor management practices. Be sure capital efficiency factors are reasonable.

Decile: 5-6 -
Your labor efficiency is about average for similar farms. This factor is affected by labor requirements for enterprises other than cows, cow handling design and equipment, and labor management practices. Be sure capital efficiency factors are reasonable.

Decile: 7-10 -
Your labor efficiency is below average for similar farms and needs to be improved. Unless you use substantial labor on non-dairy enterprises, the inefficiency may be caused by poor cow handling design, obsolete facilities/equipment, or ineffective labor management practices. Find ways to improve cow traffic patterns and worker motivation.

Milk sold per worker, lb.

Decile: 1-2 -
Your milk sold per worker is excellent compared to similar farms. This factor is affected by herd average as well as factors that affect cows per worker.

Decile: 3-4 -
Your milk sold per worker is above average compared to similar farms. This factor is affected by herd average as well as factors that affect cows per worker.

Decile: 5-6 -
Your milk sold per worker is about average for similar farms, with room for significant improvement. A low herd average or a non-dairy enterprise may help explain this factor.

Decile: 7-10 -
This factor is significantly below average for similar farms. See comments under YIELDS for milk production per cow. See also comments under LABOR EFFICIENCY for cows per worker. Improving these factors will increase milk sold per worker

The comment menu: COST CONTROL

Feed & crop expenses/cwt milk

Decile: 1-4 -
These costs are low compared to similar farms. Continue to ration balancing and crop production practices to maintain control of these costs.

Decile:5-6 -.
This factor is about average for similar farms. Be sure to properly balance the nutrition requirements of the herd and re-examine crop production practices.

Decile: 7-10 -
These costs are high compared to similar farms. Unless you produce crops well beyond the needs of your herd, make a major effort to review the herd feeding and crop production programs. You seem to be spending much more than necessary to feed your cows - at least more than others on similar farms.

Machinery costs per cow

Decile: 1-4 -
These costs are low compared to similar farms. Continue to monitor and strive for effective and economical use of equipment to help labor do its job.

Decile: 5-6 -
This factor is about average for similar farms. Pay special attention to labor management practices and equipment use to encourage efficient use of both.

Decile: 7-10 -
These costs are high compared to similar farms. Unless you produce crops well beyond the needs of your herd, reduction of these costs should be possible. Make a special effort to examine your need for and use of major equipment items. The use of custom work can be an economical means to meet peak period needs. Idle equipment can be very expensive.

The comment menu: COST OF PRODUCING MILK

Total cost of producing milk

Decile: 1 &<milk price -
Your cost of milk production per cwt. is well below average and below your average milk price. Keep up the good work, and continue to strive for lower costs to keep competitive.

Decile: 1 &>milk price -
Your total cost of producing milk is in the lowest 10 percent of Dairy Farm Business Summary cooperators. However, it is above your average milk price. In the longer run, you need to find a way to lower your total cost of producing milk.

Decile: 2-5 &<milk price -

Total cost of milk production per cwt. is near or below average and below your average milk price. This is good performance but 20 percent of the Dairy Farm Business Summary cooperators have production costs lower than yours. To remain competitive in the long run, you should seek ways to lower your cost/cwt.

Decile: 2-5 & >milk -

Your total cost of milk production is near or below the average of that for other Dairy Farm Business Summary cooperators. However, your total cost of producing milk is higher than your average milk price. This means that you are not covering your total costs, which include a 5 percent charge for your equity capital and the amount you stated as the value of operator labor and management. To obtain reasonable return for your own resources, you should try to lower your total cost per cwt. of milk produced.

Decile: 6-10 -

Your total cost of producing milk is above the average of that for other Dairy Farm Business Summary cooperators. You are receiving returns on your own resources less than the 5 percent charged for equity capital and the value you placed on operator labor and management. To obtain a reasonable rates of return on your labor and management and become competitive with other producers, you need to take steps to lower your total cost of producing milk per cwt.

Purchased inputs cost of producing milk

Decile: &<milk price -

Your purchased inputs cost of producing milk is well below average. It is also well below your average milk price, leaving a substantial return to unpaid family labor and operator-supplied resources. Keep up the good work.

Decile: 2-5 1&<milk price -

Your purchased inputs cost of producing milk is near or below the average for other Dairy Farm Business Summary cooperators. It is also below your average milk price, leaving a return for unpaid family labor and operator labor, management and equity capital. To keep up with your competition and increase the return to these resources, you should strive to lower your cost of producing milk.

Decile: 1-5 &>milk price -

Your purchased inputs cost of producing milk is near or below the average for other Dairy Farm Business Summary cooperators. However, it is above the average price you received for milk. This means that there was less than nothing left for your unpaid family labor and operator labor, management and capital. You need to lower your cost per cwt. in order to provide a positive return for the use of these resources.

Decile: 6-10 &<milk price -

Your purchased inputs cost of producing milk is higher than the average for Dairy Farm Business Summary cooperators, but you are receiving a positive return for unpaid family labor and your labor, management and equity capital. To become more competitive for the future, you need to substantially lower your cost of producing milk.

Decile: 6-10 &>milk price -

Your purchased inputs cost of producing milk is higher than the average for Dairy Farm Business Summary cooperators, and there was nothing left for unpaid family labor and your operator labor, management and capital. You need to lower your cost per cwt. in order to provide a positive return for the use of these resources and to become competitive with other milk producers.

Operating cost of producing milk

Decile: 1,2

Your operating cost of producing milk is well below the average for other Dairy Farm Business Summary cooperators. Keep up the good work, but check to see that non-operating costs are not excessive.

Decile: 3,4

Your operating cost of producing milk is well below the average for other Dairy Farm Business Summary cooperators. Keep up the good work, but check to see that non-operating costs are not excessive. Attempt to continue to strive to reduce operating costs.

Decile: 5-10 - &<milk price

Your operating cost of producing milk is similar to or higher than the average for Dairy Farm Business Summary cooperators. You should be concerned about the level of these costs and make a concerted effort to lower them. You need to examine your cropping, feeding, breeding and herd health programs to find ways of increasing production and lower your costs per cwt.

Decile: 5-10 - &>milk price

Your operating cost of producing milk is similar to or higher than the average for Dairy Farm Business Summary cooperators. Your operating costs per cwt. are higher than your average milk price, leaving nothing to cover depreciation, unpaid family labor, operator labor and management, and equity capital. You should be concerned about the level of these costs, and make a concerted effort to lower them. Examine your cropping, feeding, breeding and herd health programs to find ways of increasing production and lowering your costs per cwt.

The sixth and final page of DFBS System Analysis Report is a comparison of net costs of producing milk per hundredweight. Net costs of producing milk are compiled using the whole-farm method which sets the costs of producing all nonmilk farm receipts equal to their value. For example, net feed and crop expenses are determined by deducting accrual crop receipts including changes in crop inventories and government program receipts from total feed and crop expenses. Net cattle purchases are determined by subtracting accrual cattle receipts which include changes in cattle inventories, from the cost of replacement and expansion cattle purchased. When cattle sales and inventory growth exceed the cost of purchased cattle, net cattle purchases will be negative. A negative net cost is the same as a positive net return.

Individual or "Your farm" data are compared to the average of the most similar group of farms and a deviation from the group average is calculated. A positive deviation is the amount "your farm" exceeds the group average cost per hundredweight of milk sold. A negative deviation is the amount "your farm" is below the group average cost of production. This analysis enables the farm manager to pinpoint areas where costs may be reduced.

OTHER A.R.M.E. EXTENSION BULLETINS
(Formerly A.E. Ext. Publications)

No. 93-15	Supercenters: The Emerging Force in Food Retailing	Gene A. German Gerard Hawkes Debra Perosio
No. 93-16	Farm Income Tax Management and Reporting Reference Manual	George L. Casler Stuart F. Smith
No. 93-17	New York Economic Handbook 1994 Agricultural Situation and Outlook	Ag Ec Staff
No. 93-18	Time Value of Money	Eddy L. LaDue
No. 94-01	Fruit Farm Business Summary Lake Ontario Region New York 1992	Gerald B. White Alison DeMarree Linda D. Putnam
No. 94-02	Micro DFBS, A Guide to Processing Dairy Farm Business Summaries in County and Regional Extension Offices for Micro DFBS Version 3.0	Linda D. Putnam Wayne A. Knoblauch Stuart F. Smith
No. 94-03	Dairy Farm Cash Flow, Debt Repayment Ability and Financial Analysis	George L. Casler
No. 94-04	The Cornell Program on Dairy Markets and Policy Summary of Activities, 1993	Andrew M. Novakovic
No. 94-05	Bibliography of Horticultural Product Marketing and Related Topic Papers, Second Edition	Enrique E. Figueroa