Whole Farm Analysis-The Future of Herd Health Programs

Robert Bell, *DVM*
Agri-Smart Consulting Ltd.
St. Mary's, Ontario
Canada N4X 1C4

Data collection and historical data analysis has dominated agricultural software in the past. However, the future lies in utilizing on-farm data and historical analysis to accurately predict the future. This approach allows producers the opportunity to model and predict the impact of a proposed management technique prior to its implementation.

This is the concept that Agri-Smart Consulting has developed over the past five years. Predictive software has been developed and tested in field situations. Market research indicates that the veterinarian is the supplier of choice of on-farm consultation and although some may not feel comfortable in providing recommendations in all areas of farm management, it allows the opportunity for the veterinarian to become the "team quarterback" of on-farm consultation. The veterinarian has been trained in production problem identification and solution implementation. Therefore, it is a logical extension to expand this service to include all facets of farm management. There is a tremendous opportunity for the veterinary practitioner to supplement traditional herd health programs with this "whole farm management" concept.

Dairy farm problems are very similar regardless of location or herd size, only the benchmark goals vary significantly and can be altered to meet the individual herd's expectations.

In order to accurately predict the impact of a proposed management change, current farm records, production information, financial statements, indebtedness, feed inventories and feeding regimes, must be collected in a standardized format allowing intra and inter-herd comparison. Current farm parameters are benchmarked against goals set in each of the areas of production, finance and efficiency and, where possible, further subdivided into the various farm enterprises such as milk production, cattle sales, replacement rearing and cropping. The next step is to input estimated production, financial and indebtedness parameters resulting from the proposed management change and compare the new scenario to the current farm and benchmarked goal parameters. While the predicted impact may not correlate exactly to future operational performance due to the large number of on farm variables, our experience has been that predicted impacts are very accurate and directionally correct.

In addition to on-farm problem solution, our producers have found this tool useful in preparing cash flows to arrange bank financing. This has resulted in several banks requesting an analysis prior to lending funds. Cash flows can be predicted at any given point in the future, so producers have the opportunity to view the impact of their proposed changes after debt repayment.

We have also found this tool useful in determining the losses associated with past management mistakes and therefore have provided an analysis of losses associated with many lawsuits.

The presentation at AABP will be interactive and allow participants the opportunity to view a farm analysis being performed and gain a perspective for common problems in each of the areas of production, financing and efficiency.

I have enclosed the following example herd so that attendees can familiarize themselves with the presentation format and gain an understanding of the goals small farms should meet.

	Present	Proposed
Labour Force	1.5	1.5
Milking Cows	29	28
Percent Heifers	7	14
Dry Cows	5	8
Replacements	28	35
Liters/Cow/Year	9,495	9,500
Total Liter/Cow/Yr (BST,3X)		10,640
Time required to Milk (Hr)	1.00	1.33
Milk Fat	3.47	3.50
Milk Protein	3.40	3.4
Milk Solids Non Fat	5.72	5.5
Persistency/Mo. (%)	-3.0	-3.0
Calving Interval	13.1	13.1
Age at First Calving	24.5	24
Involuntary Culls (%)	25.0	20
Cull Rate (%)	45.0	35
Linear Score	3.0	2
Acres	249	343
MSQ	10,917	10,917
Milking Frequency	2	3
3X Milking Response		12
BST (yes=1, no=0)		0
Conception Rate	50%	50%
Replacement Costs	$1,500.00	$1,500.00
Disposal Price of Inv. Culls	$400.00	$400.00
Disposal Price of Vol. Culls	$1,400.00	$1,400.00
Disposal Price of Heifers	$700.00	$700.00
Disposal Price of Bulls	$60.00	$60.00
Additional Heifer/ET	$0.00	0
Labor Cost ($/Hr)	$7.00	$12.00
Avg Semen Cost $/dose	$25.00	$25.00
Time Horizon		1
Quota Price Unused/Used	$36.50	$35.00

Summary of Income and Expenses

	$	$/HL	$	$/HL
Total Revenue	$ 261,392.63	63.14	$ 357,118.77	69.58
Total Feed	$ 39,481.56	10.57	$ 67,478.10	13.15
Operating Expenses	$ 88,693.03	23.75	$ 132,002.56	25.72
Total Finance Charges	$ 58,075.39	15.55	$ 119,468.72	23.28
Cash Flow	$ 75,142.65	20.12	$ 38,169.39	7.44

	Present		Proposed		Goals
Farm Information					
Total Labour	2		2		1
Milking Labour	1		2		
Milking Cows	29		28		
Milking Heifers	7		14		
Total Milk Cows	36		42		40
Dry Cows	5		8		6
Total Cows	41		50		46
Replacements	28		35		28
Heifer to Cow Ratio	68%		70%		60%
Days in Milk	189.0		166.5		150
Milking Cow DMI	24.2		25.7		
Liters/Cow/Day	29.9	31.1	34.3	34.9	33
Liters/Cow/305days	9,495		10,640.00		10,000.00
Liters/Person/Year	248,970		256,617		475,000
Liters Sold/Year	373,454	95.00%	513,234	97.58%	98.00%
Liters Produced/Year	393,110		525,967		
Time required to Milk (Hr)	1.00		1.33		
Milking Time (L/Person/Hr)	539		181		500
Milk Fat	3.47		3.50		3.6
Milk Protein	3.40		3.40		3.4
Milk Solids Non Fat	5.72		5.50		
Calving Interval	13.1		13.1		13
Age at First Calving	24.5		24.0		24
Involuntary Culls (%)	25		20		15
Cull Rate (%)	45		35		30
Linear Score	3.0		2.0		2
Acres	249		343		
Acres per Cow	6.07		6.91	3 acres/cow	
Liters Shipped/Day	1,023		1,406		
MSQ	10,917		10,917		
Allowable Liters/Day	862		855		
Quota Required or Saleable(kg)	2,042		7,046		
Debt Load	465,715.79		940,805.01		
Debt Load/Cow	11,358.92		18,951.92		
Debt Load/Liter Sold	1.25		1.83		1.25
Income/HL	27.97		19.34		22
Income/Cow	2547.37		1999.77		2200
Milking Frequency	2.00		3.00		3.00

Farms milking < 100 cows should strive to milk 40 cows/person and produce 33 liters/cow/day and ship 98% of the milk produced, heifer inventories should be matched to herd reproductive performance and cull rates in order to keep replacement costs in line

Debt loads of $1.25/liter ensure growth without creating undue risk provided goals are achieved, farms with additional sources of income besides milk and cull cattle can sustain higher levels of debt

Revenue	Present	Per Liter Basis	Proposed Scenario	Per Liter Basis	Goals
Over Quota Milk Sales	25,597.04	6.85	0.00	0.00	
Milk Sales	162,475.57	43.51	276,634.75	53.90	55.00
Livestock	19,205.94	5.14	20,068.12	3.91	5.00
Grain	50,377.13	13.49	56,675.91	11.04	
Farm Tax Rebate	2,386.82	0.64	2,390.00	0.47	0.50
Other Income	1,350.13	0.36	1,350.00	0.26	
Total Revenue	261,392.63	63.14	357,118.77	69.58	60.50

By maximizing cull cattle sales an additional $5/hl in revenue can be realized in addition to milk sales

On farm quality forage production can reduce off farm feed purchases resulting in total feed costs of $14/hl

Expenses					
Feeds					
Forages	0.00	0.00	0.00	0.00	
Grains	0.00	0.00	0.00	0.00	3.00
Roughages Purchased	0.00	0.00	0.00	0.00	
Dairy Feed Purchased	12,004.31	3.21	0.00	0.00	4.00
Fertilizer, chemical, seed	27,147.60	7.27	27,147.00	5.29	7.00
Milk Cow Feeds	0.00	0.00	30,157.45	5.88	
Dry Cow Feeds	0.00	0.00	2,045.15	0.40	
Heifer Feeds	0.00	0.00	8,128.50	1.58	
Other Purchased Feeds	329.65	0.09	0.00	0.00	0.00
Total Feed	39,481.56	10.57	67,478.10	13.15	14.00
Variable Expenses					
Breeding	3,952.81	1.06	3,142.39	0.61	0.80
Vet	5,910.70	1.58	9,591.36	1.87	1.50
Crop Input/Harvest	0.00	0.00	23,803.00	4.64	
DHI	0.00	0.00	1,406.60	0.27	0.30
Calf Registrations	396.04	0.11	482.86	0.09	0.10
Bedding	0.00	0.00	0	0.00	0.30
Custom work\Rental	12,786.38	3.42	17,800.00	3.47	0.50
Fuel	4,810.98	1.29	5,000.00	0.97	1.00
Hydro\Telephone	3,928.86	1.05	6,000.00	1.17	1.25
Land Lease	2,555.47	0.68	6,000.00	1.17	0.00
Milking Supplies	2,588.85	0.69	4,530.49	0.88	0.75
Misc./Promotion/Office	914.39	0.24	914.39	0.18	0.50
Equipment Repair	12,116.45	3.24	12,000.00	2.34	2.50
Auto Costs	3,636.42	0.97	3,636.42	0.71	0.75
Cattle	2,975.00	0.80	0.00	0.00	0.00
Transportation,Mkting	100.00	0.03	0.00	0.00	0.00
Legal & Accounting	1,680.80	0.45	1,680.80	0.33	0.80
Building Repair	3,489.56	0.93	3,489.56	0.68	0.75
Total Variable Costs	61,842.71	16.56	99,304.50	19.35	11.80

Efficient dairy farms focused solely on milk production can keep variable costs under $12/hl. If any given category is 25% more than expected, further examination is required to determine why – for example machinery repairs >$2.75/hl could result in the replacement of older essential equipment or the hiring out of non-essential services.

Fixed Costs	Present	Per Liter Basis	Proposed Scenario	Per Liter Basis	Goals
Labour 3X Milking	0.00	0.00	5,825.40	1.14	0.00
BST - Labour/Yr			0.00	0.00	
Management Salaries	17,677.66	4.73	17,700.00	3.45	7.00
Hired Labor	0.00	0.00	0.00	0.00	0.00
Land Taxes\Insurance	9,172.66	2.46	9,172.66	1.79	2.50
Total Fixed Costs	26,850.32	7.19	32,698.06	6.37	9.50
Operating Expenses	88,693.03	23.75	132,002.56	25.72	21.30

Labour costs are approximately $7/hl. Therefore, production costs prior to labour should be approximately $28/hl and after labour $35/hl

Finance Charges					
Bank Service Charges	326.17	0.09	0.00	0.00	
Total Interest/yr	28,449.89	7.62	58,366.39	11.37	10.00
Total Bank Charges	28,776.06	7.71	58,366.39	11.37	10.00
Total Expenses	156,950.65	42.03	257,847.05	50.24	45.30
Net Income	104,441.98	27.97	99,271.73	19.34	15.20

The debt load of $1.25/liter should be spread over short, medium and long terms resulting in a range of $18 to $22/hl for interest and principle repayment

Principle Payments					
Total Principle/yr	29,299.33	7.85	61,102.34	11.91	10.00
Principle Payments	29,299.33	7.85	61,102.34	11.91	10.00
Cash Flow	75,142.65	20.12	38,169.39	7.44	5.20

Farms must adopt the concept of Economic Value Added (EVA) financing. EVA= Net Operating Profit After Taxes – (Net Assets Employed x Weighted Average Cost of Capital). EVA should be a positive number or directionally positive. This principle ensures that capital expenditures provide a return on investment

Current Farm Loans

Loan Description	Beginning Value	Interest Rate	Total No. of Payments	No. of Payments Made	Monthly Payment	Present Value	Monthly Interest	Monthly Principal
Operating	$54,000	7.75%	99999	1	$348.90	$53,999.85	$348.90	$0.15
Farm Mortgage	$145,000	0.00%	99999	1	$.00	$145,000	$0.00	$0.00
Barn Renovation	$25,000	7.50%	60	27	$500.95	$14,896.05	$95.63	$405.32
Equipment Loan	$7,725	5.00%	24	12	$338.91	$3,958.84	$17.83	$321.05
Farm Improve	$125,000	9.25%	180	51	$1,286.49	$104,916.21	$812.38	$474.11
Tile Loan	$10,300	8.00%	120	74	$124.97	$4,936.62	$33.52	$91.45
House Loan	$65,000	8.20%	180	3	$628.70	$64,442.60	$441.64	$187.07
Quota Loan	$74,528	10.00%	60	1	$1,583.50	$73,565.64	$621.07	$962.43
Total	$506,553				$4,812.43	$465,715.79	$2,370.82	$2,441.61

Proposed Farm Loans

Loan Description	Beginning Value	Interest Rate	Total No. of Payments	No. of Payments Made	Monthly Payment	Present Value	Monthly Interest	Monthly Principal
Operating	$54,000	5.25%	99999	1	$237.51	$53,998.74	$236.25	$1.26
Farm Mortgage	$241,000	7.00%	240	1	$1,868.47	$240,537.36	$1,405.83	$462.64
Barn Renovation	$0.00	7.50%	60	27	$0.00	$0.00	$0.00	$0.00
Equipment Loan	$7,725	5.00%	24	12	$338.91	$3,958.84	$17.83	$321.05
Farm Improve	$0.00	9.25%	180	51	$0.00	$0.00	$0.00	$0.00
Tile Loan	$0.00	8.00%	120	74	$0.00	$0.00	$0.00	$0.00
House Loan	$0.00	8.20%	180	3	$0.00	$0.00	$0.00	$0.00
Quota Loan	$246,617	5.25%	60	1	$4,682.27	$243,013.64	$1,078.95	$3,603.32
Consolidate Existing	$200,000	5.75%	180	1	$1,660.82	$199,297.51	$958.33	$702.49
Seller 2nd Mortgage	$200,000	7.00%	99999	1	$1,167.75	$199,998.91	$1,166.67	$1.09
Totals	$949,342				$9,955.73	$940,805.01	$4,863.87	$5,091.86

If the sole source of income is dairying, the maximum operating loan is 25% of the milk cheque. Schedule A banks cannot lend more than 75% of the value of the farm and buildings in long term debt while Farm Credit Corporation can exceed this limit, especially on farms with quota. The maximum term for quota and cattle repayment is 7 years and most lenders prefer 5 years. The maximum term for farm improvement loans is 8 years.

Feed Stuffs	Ingredient ($/T)	Dry Matter (%)
Corn Silage	0	36
Haylage	0	35
1st Cut Hay	0	85
Grass Pasture	0	40
Corn	0	85
Distillers	35	25
Soyameal	275	91
Premix	1000	98
Barley	0	90
Calf Starter	260	88
Calf Milk	560	12
Heifer Premix	650	98
2nd Cut Hay	70	85
Prepare	425	90
Tallow	488	99
Supplement	490	90

Replacements	$/tonne	%DM	Kg	$/DAY	DMI	Tonne/yr
Corn Silage	0	36	0	$ -	0.00	0
Haylage	0	35	11.3	$ -	3.96	115.486
1st Cut Hay	0	85	3.825	$ -	3.25	39.0915
Grass Pasture	0	40	0	$ -	0.00	0
Corn	0	85	0.45	$ -	0.38	4.599
Distillers	35	25	0	$ -	0.00	0
Soyameal	275	91	0.5475	$ 0.15	0.50	5.59545
Premix	1000	98	0	$ -	0.00	0
Barley	0	90	0	$ -	0.00	0
Calf Starter	260	88	0.1875	$ 0.05	0.17	1.91625
Calf Milk	560	12	0	$ -	0.00	0
Heifer Premix	650	98	0.625	$ 0.41	0.61	6.3875
2nd Cut Hay	70	85	0.125	$ 0.01	0.11	1.2775
Prepare	425	90	0.0625	$ 0.03	0.06	0.63875
Tallow	488	99	0	$ -	0.00	0
Supplement	490	90	0	$ -	0.00	0
Total				**$ 0.64**	**9.03**	

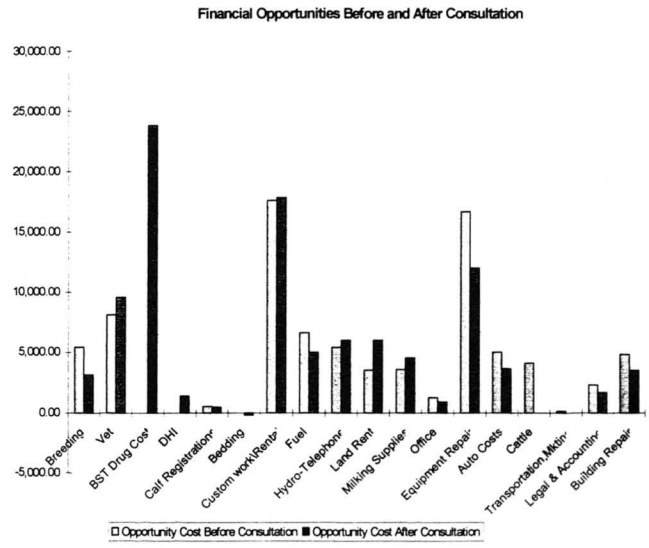
Milk Cow Rations	$/tonne	%DM	Kg	$/DAY	DMI	Tonne/yr
Corn Silage	0	36	20	$ -	7.20	204.4
Haylage	0	35	14	$ -	4.90	143.08
1st Cut Hay	0	85	2	$ -	1.70	20.44
Grass Pasture	0	40	0	$ -	0.00	0
Corn	0	85	6	$ -	5.10	61.32
Distillers	35	25	0	$ -	0.00	0
Soyameal	275	91	0	$ -	0.00	0
Premix	1000	98	0	$ -	0.00	0
Barley	0	90	3.5	$ -	3.15	35.77
Calf Starter	260	88	0	$ -	0.00	0
Calf Milk	560	12	0	$ -	0.00	0
Heifer Premix	650	98	0	$ -	0.00	0
2nd Cut Hay	70	85	0	$ -	0.00	0
Prepare	425	90	0	$ -	0.00	0
Tallow	488	99	0	$ -	0.00	0
Supplement	490	90	4	$ 1.96	3.60	40.88
Total				**$ 1.96**	**25.65**	

Home Grown Feeds	Total Tonne Required	Yield per Acre	Acres Needed
Corn Silage	429	14	30.7
Haylage	351	8	43.8
1st Cut Hay	172	4	43.0
Grass Pasture	0		
Corn	66	3.5	18.8
Distillers	0		
Soyameal	6		
Premix	1		
Barley	36	1.3	27.5
Calf Starter	2		
Calf Milk	0		
Heifer Premix	6		
2nd Cut Hay	1	4	0.3
Prepare	47		
Tallow	0		
Supplement	41		
Total Acres			164.1

Acres Available		Workable Acres	Total Acres
Glen's Farm		80.0	80
Home Farm		89.0	100
Leon's Farm		94.0	96
M&D Farm		80.0	100
Total Acres		343.0	376
Available for Crop		178.9	
	$/Ac	Total Cropping Costs	
Cash Crop Inputs/Ac	$250.00	$ 44,716.28	
Return on Cash Cropping			

	Acres	Yield	Price	
Wheat	67	50.0	$ 4.00	$13,400.00
Corn	65	120.0	$ 3.25	$25,350.00
Soyabeans	46.9	45.0	$ 8.50	$17,925.91
Total				$56,675.91

Far-Away Dry Cow Ration	$/tonne	%DM	Kg	$/DAY	DMI	Tonne/yr
Corn Silage	0	36	14	$ -	5.04	143.08
Haylage	0	35	7	$ -	2.45	71.54
1st Cut Hay	0	85	8	$ -	6.80	81,76
Grass Pasture	0	40	0	$ -	0.00	0
Corn	0	85	0	$ -	0.00	0
Distillers	35	25	0	$ -	0.00	0
Soyameal	275	91	0	$ -	0.00	0
Premix	1000	98	0.09	$ 0.09	0.09	0.9198
Barley	0	90	0	$ -	0.00	0
Calf Starter	260	88	0	$ -	0.00	0
Calf Milk	560	12	0	$ -	0.00	0
Heifer Premix	650	98	0	$ -	0.00	0
2nd Cut Hay	70	85	0	$ -	0.00	0
Prepare	425	90	0	$ -	0.00	0
Tallow	488	99	0	$ -	0.00	0
Supplement	490	90	0	$ -	0.00	0
Total				**$ 0.09**	**14.38**	



Close-up Dry Cow Ration	$/tonne	%DM	Kg	$/DAY	DMI	Tonne/yr
Corn Silage	0	36	8	$ -	2.88	81.76
Haylage	0	35	2	$ -	0.70	20.44
1st Cut Hay	0	85	3	$ -	2.55	30.66
Grass Pasture	0	40	0	$ -	0.00	0
Corn	0	85	0	$ -	0.00	0
Distillers	35	25	0	$ -	0.00	0
Soyameal	275	91	0	$ -	0.00	0
Premix	1000	98	0	$ -	0.00	0
Barley	0	90	0	$ -	0.00	0
Calf Starter	260	88	0	$ -	0.00	0
Calf Milk	560	12	0	$ -	0.00	0
Heifer Premix	650	98	0	$ -	0.00	0
2nd Cut Hay	70	85	0	$ -	0.00	0
Prepare	425	90	4.5	$ 1.91	4.05	45.99
Tallow	488	99	0	$ -	0.00	0
Supplement	490	90	0	$ -	0.00	0
Total				**$ 1.91**	**10.18**	