



Center for an
Agricultural
Economy



Sustainable Agriculture
Research & Education

...

How much does it cost to make
100lb of milk on a small farm in
Vermont?

Background information

Who am I?

What inspired this project?

What made it possible?

What was the goal?

Why this scale of farm?

Hasn't this already been done?



The Farms

- In Lamoille, Caledonia and Orleans Counties
- Milking under 100 cows
- Conventional- Shipping to DFA or Agrimark
- Primarily growing grass/hay as feed crop
- Variability in:
 - Grazing- all had some component of grazing, but some just for heifers/dry cows
 - Feeding- some TMR, some just hay and grain, all buying grain and feeding hay
 - Labor
 - Production priorities

	Average	Range
# Cows Milking	54.14	28-88
Acres in Hay	182.71	75-280
Acres in Grazing	59.57	22 -100
Total acres/cow	4.48	3.4-6.4
Lb grain fed/cow/day	17.57	10-21.5
Grain: Milk Ratio	0.33	0.21-0.45
Avg Cell Count	101K	50K-150K

Methods

1. Development of template
 - a. Consulted with Rose Wilson and Sarah Flack, drew upon previous business planning work and financial data collection experience
2. Farmer interviews/data collection*
 - a. In person or over the phone, collected data about their farm and production systems as well as financial income and expense info
 - b. Almost always required follow-ups to produce complete data
3. Data consolidation and analysis
4. Farmer meetings to go over data and discuss next steps*
 - a. Brought in consultants if desired
5. Repeat for 2021 and beyond!
6. Share data, provoke thoughts, incorporate more farms

*please note that all data was kept confidential and this was made clear for farms participating in the study.

Data collection templates

Dairy COP				
Farmer/Farm Name:				
For the period of (dates):				
	Actuals	Actuals	Actuals/cwt	Benchmark/cwt
Dairy Production Information	2019	2020		Conventional
Number of cows		75		
Quantity of milk sold (lbs/year)		961368	9614	732000
Pounds of milk per cow per year		12818		#DIV/0!
Pounds of milk per cow per day		42		
Average price per cwt		17.96391392		0
Cash Receipts				
Dairy products sold		\$ 172,699		
Market/cull livestock sold		\$ 9,372		
Breeding livestock sold				
Calf sales		\$ 1,813		
Hay		\$ 1,370		
USDA & Ag program payments				
Compost		\$ 3,000		
DFA patronage	\$ -	\$ 988		
TOTAL CASH RECEIPTS	\$ -	\$ 189,242		\$ -
Cash Expenses				
Variable Expenses:				
Bedding		\$ 2,050	\$ 0.21	
Breeding			\$ -	
Custom hire			\$ -	
Hay			\$ -	
Grain		\$ 36,954	\$ 3.84	\$ 6.30
Fertilizer & chemicals		\$ 2,524	\$ 0.26	\$ 1.06
corn seed		\$ 3,924	\$ 0.41	
Freight & trucking (incl. all milk check deductions)			\$ -	\$ 1.14
spray charge		\$ 926	\$ 0.10	
Fuel and oil		\$ 6,245	\$ 0.65	

Farm X

Acres in hay	225
Acres grazing	64
Breed	Holstein
Average Cell count	low
Management style (volume/components)	components
# dry cows	10
Raising heifers	no
Raising calves	no
Feeding milk or milk replacer?	n/a
Raising Feed? How much	All (see table below)
Bought feed? How much	Grain only
Grain fed/cow/day?	12 lb
Buying replacements	Yes 13 in 2020
Unpaid bills at end of year?	no
Pre-paid bills for next year?	no
Feed company? Helpful?	Morrison's, yes

Feed grown:

Milk check deductions:

	loads	tons		Label	amount
grass silage	145			advance	1509
corn	46 loads	414 ton		capital	896.1
bales		56		cwt	400.02
square		532		marketing	1646
Acres hay	140			hauling	8630.35
Acres corn	18			TOTAL	13081.47

Notes:

Bought in 13 cows in 2020 since they do not grow their own stock, we put this as a capital expense but it could go in COGS since it is an annual business expense.

Data Consolidation and Dissemination

February, 2022

Dear Farm X,

Thank you for participating in this dairy cost of production study! I hope that the information is valuable to you, and that you consider using the template to plug in 2021 numbers and future years of data to compare and learn from. You will receive a check for \$200 for your time and participation, and also have access to technical assistance including grazing/pasture consultant Sarah Flack, independent dairy nutritionist Bill Kipp, any/all of my time you would like to go over numbers, or if you have another request we can probably make it happen! Please do not hesitate to reach out with any questions concerning the data, and if you have questions about a specific farm's data, I'm happy to connect you with them once I've checked in about confidentiality on both sides.

Based on a quick assessment of your numbers, here are some quick facts and areas of interest:

Congratulations on:

- Your low SCC
- Grain:Milk ratio- right around average for your herd size/breed
- Milk production per cow, what is your current rolling herd average now?
- Added farm store income
- Fuel and oil expense is low
- It's great that you are able to make most of your own feed, is this the case for 2021 as well?

Some key leverage points that you could think about include:

- You are feeding a large grain ration, but your grain:milk ratio is right where it should be, maybe worth chatting with our nutritionist to lower the grain bill, but not necessary
- Bedding cost is pretty high, where are you getting it now?
- Trucking is high for your size, do you have to pay for JHF pick ups?
- Farm insurance high in comparison, maybe due to farm store
- Did you buy in a typical amount of animals in 2020? Or was this high?

Overall, your cost of production fell just slightly higher than the average of the group when considering just fixed and variable expenses, but when you layer in loan payments etc you are about 10% higher than the average, but you are producing a more specialty product. I'd suggest digging into your grain feeding program and looking at some of the small notes above, but in general you guys have a dialed system for high quality milk production and hopefully these costs are being covered by JHF!

Thanks again for your participation, please let me know if you'd like to input your 2021 numbers, would like to use this template on your own, or are interested in any of the offered technical assistance. If you are interested in digging in deeper in the future, ask me about the Farm Viability Program.

Best,

Silene

<https://docs.google.com/spreadsheets/d/1TEctkwCfpXfV7vNcZ3CS3dA1jdKHKtReXb2agEB7S4/edit#gid=1325940323>

Dairy Cost of Production Worksheet										
Farmer/Farm Name: Farm 1										
For the period of (dates): 2020										
Farm information	Farm 1 Actuals	Average	% different than avg	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6	Farm 7	
Acres in hay production	250	182.71	38.83%	200	250	225	75	89	160	
Acres in grazing	60	59.57	0.72%	100	60	100	22	55	40	
Total Acres/cow	4.77	4.48	6.59%	3.41	4.77	5.51	3.46	4.11	3.67	
Raising young stock?	yes			yes	yes	yes	yes	yes	no	
Grain fed/cow/day (lb)	20	17.67	13.82%	21.50	20	20	17.5	14	10	
Grain: Milk ratio	0.39	0.33	19.95%	0.30	0.39	0.45	0.35	0.30	0.21	
# dry cows	15	9.57	56.72%	6.00	15	10	10	12	10	
Dry cow: milker ratio	0.23	0.20	12.68%	0.07	0.23	0.17	0.36	0.34	0.19	
Feed company	Poulin			Poulin	Poulin	Cargill	Poulin	Morrisons	Morrisons	
Average cell count	100000	101,428.57	-1.41%	135000	100000	150000	110000	65000	100000	
Dairy Production Information	lcwt			lcwt	lcwt	lcwt	lcwt	lcwt	lcwt	
Number of cows	85	54.14	20.05%	88	85	59	28	35	54	
Quantity of milk sold (lbs/year)	1208476	12065	11081.51	8.87%	2308073	1208476	957722	514019	596336	961388
Pounds of milk per cow per year	14561	19783.17	-4.18%	28238	18581	16233	18358	17038	17903	
Pounds of milk per cow per day	51	54.20	-6.18%	72	51	44	50	47	49	
Average price received per cwt	19.53098528	18.51	5.52%	16.99603965	19.53098528	18.52134544	18.84043591	18.93714282	17.96388094	
Avg price per cwt post deductions	17.83786499	16.86	5.88%	15.83076144	17.83786499	17.33897282	16.82227511	17.41199592	16.80321542	
Milk buyer	DFA			DFA	DFA	agmark	DFA	DFA	DFA	
Cash Receipts										
Dairy products sold DFA or Agmark	\$ 236,637	\$ 178,119.44	32.29%							
Dairy Products sold, secondary buyer	\$ 56,342.00									
Marketed livestock sold inc calves and breeding livestock	\$ 800	\$ 10,656.14	-92.49%							
Hay	\$ 200	\$ 785.00								
Dairy related payments eg regional premium, patronage, program payments etc	\$ 18,602	\$ 7,702.40	141.51%							
Other income (raw milk, farm store, other enterprises)	\$ 2,500	\$ 8,590.00	-70.90%							
+FSA cfp		2.07								
+ grant income	\$ 56,854	\$ 4.71	3.86	28.89%						
TOTAL CASH RECEIPTS	\$ 314,693	\$ 275,556.71	14.16%							
Cash Expenses										
Variable Expenses:		lcwt averages								
Bedding	\$ 15,898	\$ 1.32	0.70	87.87%	1.12		0.85	0.19	0.52	0.21
Breeding	\$ 3,530	\$ 0.29	0.41	-28.97%	0.45	0.22	0.52	0.39	0.59	
Custom hire	\$ 11,537	\$ 0.96	1.29	-25.99%		0.55	0.09	3.49	1.37	
Hay	\$ 7,920	\$ 0.66	0.38	70.78%	0.33		0.17			
Grain	\$ 101,412	\$ 8.41	8.99	20.24%	5.91	7.16	6.22	8.68	8.71	3.84
Fertilizers	\$ 2,697	\$ 0.22	0.29	-25.05%	0.53		0.29		0.13	0.26

Results

	Average	Range
Cwt milk shipped	11081.51	5140 - 23081
Rolling herd average (lb)	19783.17	16233 - 26228
#milk/cow/day	54.20	44 - 72
Average price received	\$18.51	\$17.00 - \$19.53
COP/cwt fixed and variable expenses only	\$20.44	\$15.15-\$26.62
COP/cow fixed and variable	\$3998.84	\$2827-\$5112
COP/cwt including debt service and depreciation*	\$23.37	\$18.98- \$27.71
COP/cwt including family living allocation	\$24.89	\$19.02 -\$27.85

*Depreciation assigned at \$10,000/50 cows/ year for the purpose of this study

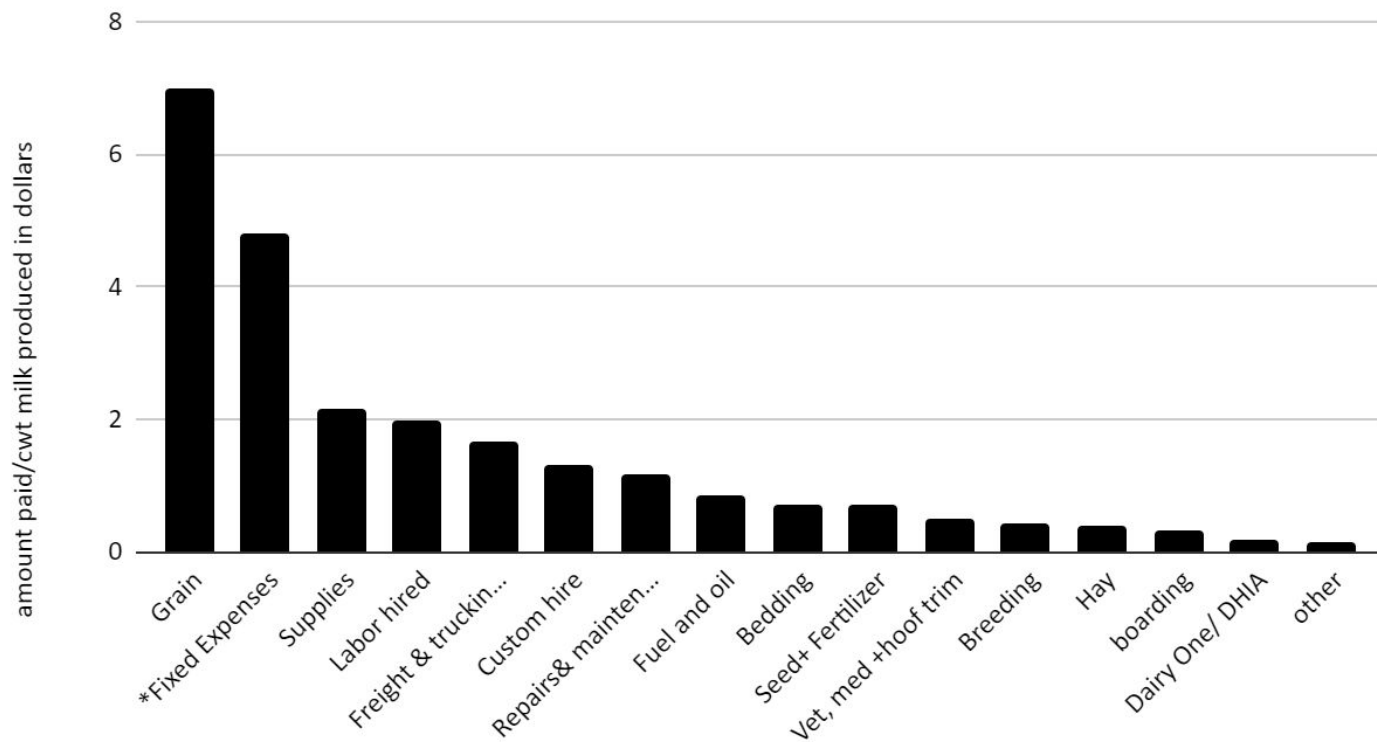
This deficit equates to \$53,853.66 over the 1.1million pound average milk production per farm which has to be made up via other income streams on or off the farm, additional debt, savings loss, or most commonly asset erosion.

Keep in mind that \$23.37 does NOT include owner draw, owner labor, or family living expenses

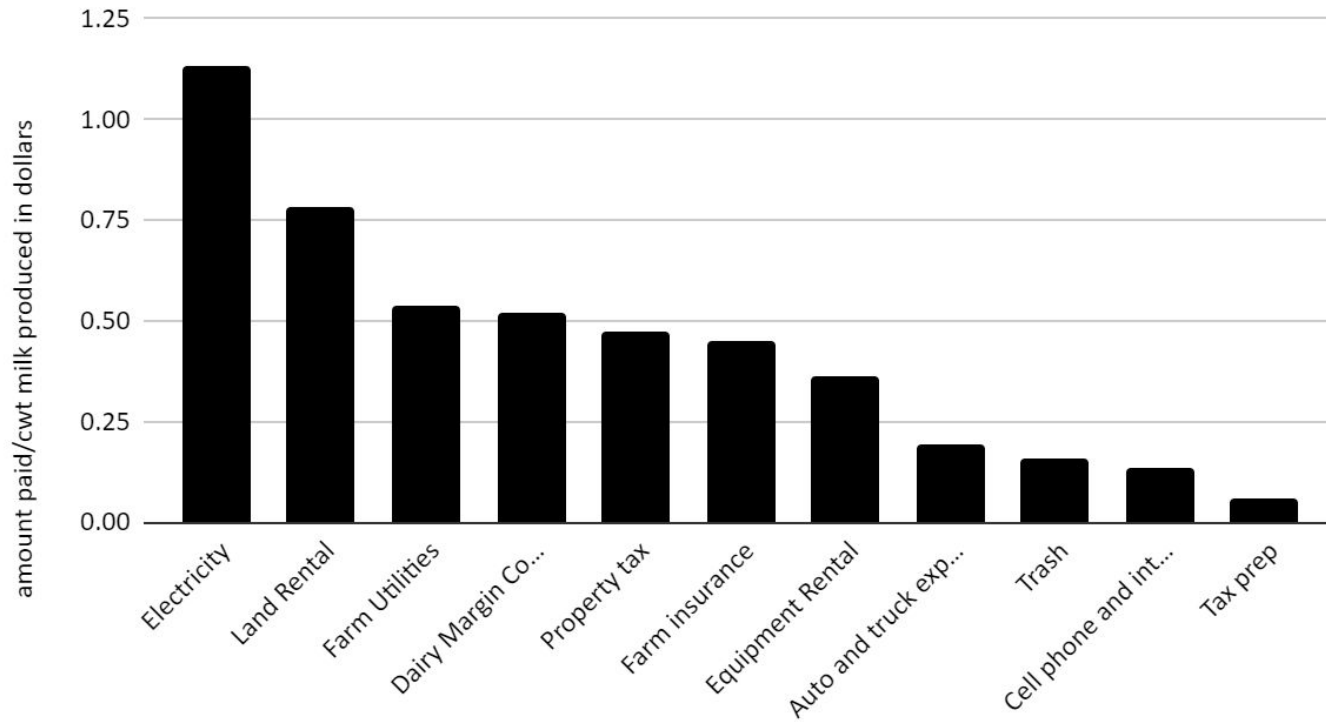
*\$21,230 deficit between COP fixed and variable and avg price received.

In what other ways is this deficit felt on the farm?

Farm Expense per cwt Milk Produced



Fixed expenses per cwt



Key leverage points identified/used to reduce COP

- Ration changes to decrease grain bill
- Forage management/ grazing management
- Water access and mineral and salt access
- Exploration of alternative bedding sources and products
- Reduction of young stock for farms carrying too many
- Bulk tank size discussion for farms with abnormally high freight- usually due to every day pick-ups vs every other and stop charges incurred
- Utilization of IBA or other resources to track down milk quality issues (need more resources)
- Electricity costs- in most cases farms have already worked with Efficiency Vermont to replace light bulbs, pumps, and fans, but not always, so it is worth looking into.
- Hauling (Freight and trucking and other milk check deductions): this is a massive expense for these small farms. Any changes made to decrease hauling costs for small farms would make a significant impact on COP and thus farm profitability.

	2020	2021	% increase
Average Price Received/ cwt	18.51	19.58	5.8%
COP fixed and variable expenses	20.44	21.33	4.4%
COP including debt service and depreciation	23.37	25.31	8.3%

- Include more farms to build the data set and engage with more small farms across the state
 - Collaboration with UVM extension
- Share this data with stakeholders and start thinking creatively
- Small farms cannot compete! Let's get radical and replace band-aids with fresh ideas if we value small farms on our landscape.
- Organic is facing the same issues! Please look at similar studies done by NOFA VT and UVM ext

Next steps



Thoughts? Ideas? Questions?



To prime your brain:

New markets or processing facilities?

Alternatives to commodity grain markets?

Restructuring (or subsidization) of hauling for small farms?

Pricing structures that incentivise farms to stay small rather than grow and value the social and ecological benefits of small scale agriculture?

Please reach out! silene@hardwickagriculture.org