

START-UP AND OPERATING COSTS OF SMALL FARMSTEAD CHEESE OPERATIONS FOR DAIRY SHEEP¹

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Introduction

Farmers with sheep dairies may want to look at the option of making cheese on their farm instead of selling whole milk to a cheese processor. This type of enterprise will require added labor for marketing and cheesemaking and extra costs to build the cheese facility.

In this paper, in Part I, examples of actual costs of setting up 3 cheesemaking operations along with some dimensions of rooms and lists of equipment are given. These actual set-up costs focusing on the cheese facilities are provided from 2 sheep and 1 goat dairy in Vermont. Each started construction around the years 1997-1998.

In Part II, some sheep dairy farms' financial summaries will be provided with a basic description of the operation. This will allow individuals interested in seeing costs/income associated with different sizes and types of operations to be able to compare different scenarios.

Operating budgets from 4 sheep dairies in Vermont and New Hampshire in their initial full year of operation is presented. Each farm had differing capital investments to carry for the whole farm and their depreciation and loan repayment costs are not presented. The financial data from these 4 farms was taken from one of the calendar years of 1998-2000, depending on the farm. All the farms made a hard, pressed, aged cheese that they sold 'green' (before aging) to another business that aged the cheese and marketed it under their own name. In effect, the farms were getting a wholesale price for what would be turned into a gourmet cheese.

The farmers sold their cheese to the affineur/marketer for up to \$5.70/lb final product (some shrinkage occurs during the 4-6 months of aging). The affineur/marketer sold the cheese, depending on the final grade of quality for between \$9.00 to \$11.50/lb. wholesale and between \$12.00 to \$18.50/lb retail. The aging process required the investment of constructing an underground cave and paying for a full-time affineur to tend to the cheeses. However, one of the biggest costs going into the final product is the bookkeeping/promotional material/shipping that together make up the cost of marketing.

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Part I: Costs of setting up a sheep dairy with cheese-making facilities

From the following examples, we find that it can cost as little as **\$10,000** to build cheese making facilities and equip it if you are willing to do the labor yourself, buy used equipment and use multi-purpose vats (one that pasteurizes as well as cultures the curd). This is gleaned from **Example 1** where some of the actual building costs are hidden in the initial barn set up (\$30,000) where the whole dairy is housed (winter area for goats, milking parlor, milk room and cheese room). Even though this data is from an organic goat dairy, the set-up costs here should be identical for sheep. Another entry from this farm is the cost of setting up a one room house for interns which was “the best investment we made” according to the farmers.

In **Example 2**, the farmers had an existing barn, recently rebuilt after a fire, to start from. While they were able to start milking and making cheese for about **\$15,000**, they added a better combination cooler/pasteurizer/cheese vat for an additional **\$12,000** two years later. Wanting to offer cave-aged cheese increased their investment another **\$27,000**. Except for some specialty stone work on the cave, the cheese room and cave facilities were built by the farmers' labor. It is worthy to note that this farm has won more than a handful of American Cheese Society cheese contest awards.

If you think you will be building everything from ‘scratch’ that will be solely for a cheese facility and where tourists will be welcomed, the sheep dairy in **Example 3** gave a price tag of between **\$40-\$50,000**. This farm built their facilities with an eye for having the public coming to the farm for tours and for buying cheese. This probably increased the cost of the building but, again, they used mostly their own labor for construction. [Example 3 is the same farm as Sheep Dairy 4 in Part II.]

Example 1 Goat Dairy Milking 20

Barn \$30,000 30' X 60' including plumbing and furnace and own labor.

4 stall parlor with stanchions (9' X 9') cost \$2,000 for system and stand

Milk room (9' X 9')

septic system

Wood heated boiler for pasteurizer, water and barn \$7,000

Cheese room made with used equipment and own labor (9' X 20')

Kettle cheese vat \$3,000 plus \$1,000 to equip plus 400 cheese molds

Used refrigerators \$200

Sink \$100

Draining table \$180

Dairy panel \$500

Aging cooler \$500; Cooler room (5' X 9')

Aging cellar \$? Not done....(10' X 22')

Solar Barn, 20' X 80', expansion for goats \$8,000

Intern house \$4,000 no plumbing; one room 16'X20'

Lumber \$1050-1350

Wiring \$215

Paint \$100

Roof \$535

Housewrap \$90

Insulation \$300

Sheetrock \$225

Concrete tubes \$145

Windows and doors \$115-215

Monitor heater \$700

Ditch machine rental \$40

Misc \$65

Example 2 Sheep Dairy Milking 50

Parlor and Cheese Plant combined - \$15,000

some foundation existing; own labor; dairy board and painted plywood paneling

[first and second year]

Parlor - \$3,000 12'X30'

12 headgates and bucket milking machine and vacuum

Cheese vat - \$750

5 gallon custom made including knife

Milk Room 10'X20'

Air Lock room 10'X6'

Cheese Room 16'X20' has 5'X7' cooler

Compressor, used, \$200

Can cooler - free; needed recharging of refrigerant

Two milk cans

[borrowed a 40 gallon vat for during second year]

[third year]

Combination bulk tank/vat/pasteurizer/Mueller 100 gallon- \$12,000

40 gallon kettle vat from Jacque Brousseau \$600 (own labor to install)

replaced defective valve for \$650

Chart recorder less than \$1,000

Two reconditioned thermometers \$400

[fourth year]

Vat 100 gallon - \$3500

Yogurt capper

Cave -\$27,000 own labor built 2 walls on back wall of ledge. Hired stone work and façade.
Concrete culverts. Did own painting, plumbing and electrical work.

Well-\$1,000 including \$200 for the concrete tile

Two compressors to keep temperature cool enough in summer - \$6,000 includes installation

Cave - \$20,000 with 2 rooms each 10' X20' separated from back ledge by 6' X20' space;
front weighing and wrapping room 10' X16'

Example 3 Sheep Dairy Milking 69

Parlor with 12 headgates \$10,000

Barn, hoop-style with steel girders, 40' X 100', owner labor only, \$20,000

Cheese Building \$40-50,000 paid labor except inside tiling

Make room 30' X 15'

Aging cooler 12 X 15'

Front office/viewing room 8' X 12'

Can cooler room 12' X 15'

Equipment \$10,000

2 vats, refrigerator, tables, racks, molds, etc.

Septic \$5,000, toilet is required by VT state for cheese facility
(whey fed to pigs)

Part II: Operation Budgets of 4 farmstead cheese sheep dairies

- Operators: Farm couple, one full-time on farm, one part-time with part-time off-farm job
- Hired labor: Intern for 10-12 weeks
- Flock size: 110 ewes
- Production per ewe: 225 lbs. milk/lactation; 45 lbs. cheese/ewe
- Farm size: 60 acres leased
- Year in business: Second year
- Feed: grazing in summer; own hay and purchased grain
- Product: pressed, raw cheese sold green/wholesale to affineur/seller
- Cheese yield for sale: 4950 lbs.

This young farm couple had done an internship on a sheep dairy and were hoping that they could generate a full-time income from a variety of farm enterprises. During the period when the ewes were dry, maple sugaring and marketing of wool and meat products were things that contributed to their farm occupation. Both of them shared the milking and cheesemaking work and felt that they could easily handle a flock of 110 ewes. They felt it was very important to try to market the meat and wool as value-added direct sale as much as possible to make the whole operation profitable.

They said they could receive between \$4.80 to \$5.25 per pound of green cheese, if everything went well. They received payments for their green cheese before and after aging with a grading panel determining the quality premium. In terms of return on their actual milk, they earned \$0.97/lb. of milk for their raw cheese sold one year and \$0.85/lb. of milk sold in two subsequent years. If they had sold raw milk, they would have gotten closer to \$0.60/lb. of milk. They made some feta cheese [cheese yield to milk ratio of 1:4] and the wholesale price of \$7/lb. gave them a return of \$1.75/lb. of milk produced. However, they found it hard to sell the cheese at that price. The advantage of selling a green cheese for someone else to age and sell is the absence of time and expense in aging and selling. The advantage of selling their own cheese was providing them with a better cash flow and better return on their milk.

This example is unique among the 4 examples in that they rent the entire farm facility. This would allow a quicker return to investment than the other 3 examples. Their numbers in the Farm 1 column were based on averages of financial records they kept for the years in 1998 and 1999. For any missing but relevant data, they consulted with experienced dairy sheep producers to back-up their estimates.

The Farm 1P column is a projected estimate of what they thought you could expect if you just increased your milk production per ewe from 225 lbs. to 500 lbs.

SHEEP		Farm 1	Farm 1P
No. head		110	110
milk /ewe		225	500
Lbs cheese shipped		4950	11000
INCOME \$			
Cheese sales		21780	48500
Lambs		6600	6600
Wool		385	385
Culls		440	440
Other			
Total cash income \$		29205	55925
EXPENSES \$			
Grain, feed, min.		4950	4950
Forages		4730	4730
Fert, seed, testing		440	440
Gas, fuel, oil		440	440
Insurance		1100	1100
Labor		4400	4400
Land costs		7150	7150
Repairs		1000	1000
Shearing		396	396
Supplies- cheese		450	1000
Supplies other		630	630
Vet + medicine		770	770
Utilities		1000	1000
Other		440	440
Total cash expense \$		27896	28446
Income - expense \$		1309	27479
inc-exp/ewe \$		12	250
cash exp/ewe \$		254	259

Sheep Dairy 2: Actual vs. Projected

- Operators: Farm couple, one full-time on farm, one part-time on farm with part-time off-farm job
- Hired labor: Hire custom operator to make baleage on rented acres.
- Flock size: 43 ewes (actual); 100 ewes (projected data)
- Production per ewe: 240 lbs. milk/lactation; 22.3 lbs. cheese (actual); 400 lbs. milk and 80 lbs. cheese (projected)
- Farm size: 16 acres pasture owned; 10 acres rented
- Year in business: First partial season (milked 6/5 to 8/21/99)
- Feed: grazing in summer and 2 lb. conc./day/lactating ewe
- Product: pressed, raw cheese sold green to affineur/seller
- Cheese yield for sale: 960 lbs. of cheese (actual); 8000 lbs. (projected)

While one of this couple worked a full-time, off-farm job, the hours contributed to the business was many and his expertise crucial. Plus, he sheared all their sheep. This farm used their farm data and other average costs from farm statistics to project what a 100-ewe dairy's budget would look like. They sold their cheese wholesale at about a rate of \$4.50 per pound, with most of their yield of cheese meeting highest grade standard for sale to an affineur/seller.

In reality this couple had a goal of limiting their ewes to between 40-80 in number and to increase their production from 2-3 lbs. of milk/ewe per day to 5 lbs. [Est. lactation yield from 240 lbs./ewe in the former case to 600 lbs./ewe in the latter case.] The projected case they present here for a 100-ewe dairy is of 400 lbs./ewe per lactation.

They made very high quality cheese (none rejected) and estimated that if they could earn \$1/lb of milk from 100 sheep with a 3 lb. milk/day avg. daily yield/ewe, it would pay them \$10/hour for their time worked. Their goal was for the off-farm job to be phased out and both of them 'retire' early to the sheep dairy business.

SHEEP		Farm 2
No. head		100
milk /ewe		400
Lbs cheese shipped		8000
		Farm 2
INCOME \$		
Cheese sales		36000
Lambs		6850
Wool		280
Culls		600
Total cash income		43730
EXPENSES \$		
Grain, feed, min.		9250
Insurance		3614
Repairs		2204
Supplies other		1500
Taxes		600
Vet + medicine		1000
Utilities		1000
Other		500
Total cash expense		19668
Income - expense \$		24062
inc-exp/ewe \$		241
cash exp/ewe		197

Sheep Dairy 3

- Operators: Farm couple, both full-time on farm
- Hired labor: Intern for 10 weeks
- Flock size: 38 ewes
- Production per ewe: 107 lbs. milk and 17.3 lbs. cheese
- Farm size: 30 acres owned; 15 acres leased
- Year in business: First partial season (milked 6/25-8/25/00)
- Feed: grazing in summer; purchased hay and grain
- Product: pressed, raw cheese sold green to affineur/seller
- Yield for sale: 660 lbs. of cheese; purchased 570 lbs. cow milk and made into cheese.

Run by couple new to dairy sheep farming and new to this farm. Labor assistance was a 13 year old daughter and college age daughter for a short period in summer. One intern was paid \$200 per week and given room and 5 meals a week. Housing for the intern consisted of converted stalls in a former horse barn on the second floor above the cheese facility. The farmers enjoy gourmet cooking and were experimenting with other cheese and sausage recipes that they could sell retail at farmers' markets.

Their goal was to first, have the business pay for the tax burden on the farm. Since starting their farm, their property taxes have decreased by \$5,000 per year due to Vermont's Use Value Appraisal Program. Second, they did want to make a profit but they were not expecting to live on this totally, having 'retired' early from successful careers.

Since this was their home as well as their farm business, they made sure that the improvements were dual-purpose, meaning that the infrastructure they built with capital investments could convert to another use if their farmstead cheese business was not satisfactory to them. When farmers sell specialized buildings, they rarely make a profit. Be aware that it is easy to over-capitalize.

They milked 38 crossbred ewes (30 first lactation and 8 multiparous culls) purchased from other sheep dairies. They lambed in April and weaned the lambs and milked from June 25-August 25, only 2 months. They had 66 live lambs and saved 31 female replacements. Having a low production year with first lactation ewes and keeping many replacements put their annual cash cost per ewe very higher at over \$400 compared with some other sheep dairies in this paper.

They produced 660 pounds of a pressed, cave-aged cheese but some batches were thrown out (~120lbs) and not included in this total which, if included, would have brought the yield of cheese per ewe to 20.5 lbs. This cheese was sold wholesale to an affineur/seller. They purchased 570 pounds of cow milk and made cheese for sale at the farmers' market besides this.

SHEEP		Farm 3
No. head		38
milk /ewe		est 100
Lbs cheese shipped		660
		Farm 3
INCOME \$		
Cheese sales		5480
Lambs		416
Culls		443
Other		2384
Total cash income \$		8723
EXPENSES \$		
Consulting		65
Grain, feed, min.		1486
Forages		2526
Fert, seed, testing		116
Insurance		997
Labor		2602
Land costs		553
Repairs		1072
Shearing		
Supplies- cheese		1866
Supplies other		1337
Vet + medicine		578
Utilities		624
Work animal expense		246
Other		1410
Total cash expense		15478
Income - expense \$		-6755
inc-exp/ewe \$		-178
cash exp/ewe \$		407

Sheep Dairy 4

- Operators: Farm couple, sole operators; one has off-farm business part time
- Hired labor: Intern for summer
- Flock size: 60 ewes
- Production per ewe: 233 lbs. milk and 50 lbs. cheese
- Farm size: 45 acres
- Year in business: First commercial year
- Feed: grazing in summer, 4,000 bales harvested for winter; purchased concentrate
- Product: pressed, raw cheese sold green to affineur/seller
- Cheese yield for sale: 2000 lbs. wholesale; 1000 lbs. retail

Run by a couple in their 3rd year of farming. They had milked a few sheep in 1998, milked a few and started trying to make cheese in 1999 then, in 2000, they started what they felt was their first “commercial” year. The husband still kept a part-time non-farm business for income. They hired an intern for the summer who lived at the farm site in a trailer and was paid \$150 per week.

They built a hoopstyle barn for their sheep and were in the process of finishing their cheese building. This couple was planning to build a house next to the farm and cheese operation and move there. They intend to do little or no off-farm work and that the farmstead cheese operation with an on-farm cheese store where they could have retail sales in their highly touristique area of Vermont. They plan to continue to make the ‘green’ cheese and buy it back to sell at their store along with a few other of their own line of cheeses.

They milked 60 ewes and carried 5 rams and 17 unbred yearlings that year. They produced 2,000 pounds of pressed cheese sold green to an affineur/seller. They also made 1,000 pounds of another cheese and sold it at a health food cooperative and at a farmers’ market. Their milk yield was estimated back from this at 14,000 lbs. for the year or approximately 233 lbs./ewe per lactation. [3,000 lbs. of aged, hard cheese with a 1:5 cheese to milk weight yield gives 14,000 lbs. of milk. 14,000 lbs. of milk/60 ewes is 233 lbs. milk/ewe per season.]

SHEEP		Farm 4
No. head		60
milk /ewe		233
Lbs cheese shipped		3000
		Farm 4
INCOME \$		
Cheese sales		10732
Lambs		1527
Wool		250
Other		170
Total cash income \$		12679
EXPENSES \$		
Grain, feed, min.		4340
Fert, seed, testing		560
Gas, fuel, oil		910
Insurance		394
Labor		1800
Repairs		2202
Supplies- cheese		1820
Supplies other		5300
Taxes		884
Vet + medicine		959
Utilities		2100
Other		1098
Total cash expense		22367
Income - expense \$		-9688
inc-exp/ewe \$		-161
cash exp/ewe \$		373

Part III: Discussion

It is important to identify your financial and personal goals with the cheese business before starting and to assess them annually. One farmer in the study noted that it would be best to know your sheep business and have already capitalized a lot of the sheep equipment before you begin investing in a cheese room. Also, if you are already losing money on a ewe and lamb business, you can not expect the dairy to make up for the loss and pay back its investment. Sheep dairying, including a farmstead cheese business, is an additional profit area to augment your already profitable operation.

In order to continue to be sustainable, the flock must cover its' own costs plus contribute to the family living expenses, plus pay back borrowed money plus replace depreciated equipment. The investment costs were not listed here and only Sheep Dairy 1 that rented the farm showed a small profit over costs including the rent. If you are building your capital infrastructure (barn and cheese facility) and flock at the same time as your cheese business, your trip to profits will take longer, as shown in these case studies.

It is hard to say how to advise new farmers on the decision of how to develop their sheep dairy operation. The late Olivia Mills, world renowned author of Practical Sheep Dairying said "Learn how to make good cheese, first. Anyone can milk a sheep but not anyone can make good cheese. You should be making profits in your first year of production." If you are learning the cheese trade at the same time of learning your sheep and improving production, the data here shows that you won't make a profit. The advice to take home is to start experimenting with cheese and get good at it before you invest heavily in it. Ideally, you would rent a cheese facility first or, try it in your kitchen and at cheese workshops.

Noteworthy is the example in Sheep Dairy 1 of the return per pound of milk when they made their own cheese for sale at retail prices. While they had to age and market the Feta, they received \$1.75 per lb. of milk vs. \$0.90, at most, by selling a cheese at wholesale. By combining a low investment (no pasteurization required) wholesale cheese with a different retail cheese, a new cheesemaker can slowly branch out, learn marketing and bring in more profit. Even if you market your own cheese, you will often accept a wholesale price at a vendor's like a health food store or a cheese shop. Nonetheless, cheese income per pound of milk is not the only factor that made a significant effect on cash flow.

Look at the cheese sales per ewe at the bottom of the SHEEP section at the top of Table 1 in the Appendix. Farms 3 and 4, which were beginner farmers, showed only \$144 and \$179 of cheese sales per ewe. Farm 1, with more experience, is nearly \$200, and the targets on Farm 1P and Farm 2 show goals of \$441 and \$360, respectively. Next, take a look at income per ewe. This shows the importance of lamb income when combined with cheese sales. Obviously, selling retail, as mentioned before, brings more cash, but, also demands more time, skills, and working with the public.

Another significant factor in profits is milk yield per ewe. In this data, there was a high variability in milk yield per ewe: from about 100 lbs. of milk per ewe to an actual 225 or 233 pounds, and hopes for 400-500 pounds. Dairy farms have to make good quality milk at good production rates to have a chance at profitability. Breeding plays an important part; the hope is for each generation to have the ability to produce more than the previous one. The only way to help guarantee this climb is to do milk component testing and yield recording along with udder evaluation on each ewe.

Look at the actual and projected profits on Sheep Dairies 1 and 2 as production is elevated to 400 or 500 pounds per ewe. The income minus operating expense line shows modest figures of between \$24,000 to \$27,5000 per year. Being a partial year enterprise, it could be combined with more enterprises or part-time off-farm work in the off-season to bring a reasonable annual income to the family.

APPENDIX

TABLE 1: FARMS 1-4 COMPARED

SHEEP	Farm 1	Farm 1P	Farm 2	Farm 3	Farm 4
No. head	110	110	100	38	60
milk /ewe	225	500	400	est 100	233
Lbs cheese shipped	4950	11000	8000	660	3000
Cheese sales/ewe	198	441	360	144	179
Total income/ewe	266	508	437	230	211
	Farm 1	Farm 1	Farm 2	Farm 3	Farm 4
INCOME					
Cheese sales	21780	48500	36000	5480	10732
Lambs	6600	6600	6850	416	1527
Wool	385	385	280		250
Culls	440	440	600	443	
Other				2384	170
Total cash income	29205	55925	43730	8723	12679
	Farm 1	Farm 1P	Farm 2	Farm 3	Farm 4
EXPENSES					
Consulting				65	0
Grain, feed, min.	4950	4950	9250	1486	4340
Forages	4730	4730		2526	
Fert, seed, testing	440	440		116	560
Gas, fuel, oil	440	440			910
Insurance	1100	1100	3614	997	394
Labor	4400	4400		2602	1800
Land costs	7150	7150		553	
Repairs	1000	1000	2204	1072	2202
Shearing	396	396			
Supplies- cheese	450	1000		1866	1820
Supplies other	630	630	1500	1337	5300
Taxes			600		884
Vet + medicine	770	770	1000	578	959
Utilities	1000	1000	1000	624	2100
Work animal expense				246	
Other	440	440	500	1410	1098
Total cash expense	27896	28446	19668	15478	22367
Income - expense	1309	27479	24062	-6755	-9688
inc-exp/ewe	12	250	241	-178	-161
cash exp/ewe	254	259	197	407	373

Cash expenses per ewe also shows more variability: ranging from \$197 to \$407/ewe. The 2 farms in the vicinity of \$400 show high start-up costs but, it looks like a cost of \$200-\$250/ewe might be attainable with a real effort at controlling costs. The dollar not spent in the barn can be used for family living.

Profit is return to the operator's time (and other unpaid family members), management, and capital investment. Profit can be used for family living expenses, savings, principal repayment, and new investments on the farm. If you plan to build a cheese business at the same time as your flock, how long can you wait before you are making enough money to live on?

Following this data, getting a loan to **start** a sheep dairy with a cheese room might be just about impossible. You can see how it would appear risky, with the farm losing money in the first years, and there being no money generated to repay a loan. Usually, with a new enterprise, a lender might only be interested in participating after several years, once you have the skills in production and marketing, and have financial records that document your progress. Then a lender may come in to help with an expansion or labor saving equipment.

It would be the least risky to first have a profitable sheep dairy selling whole milk to then, budget out and start a cheese business while it still is selling milk wholesale. This would allow for a steady cash flow and a sure, second market for the milk while the cheese business was starting to grow.

In summary, we have shared some real life costs of building a cheese rooms from the small, in-barn room to the higher cost one with a retail shop for tourists. In addition you have seen the real and projected costs and incomes from several sheep dairies that make and sell farmstead cheeses in Vermont and New Hampshire. These farmers have found that a demand exists for these specialty cheeses and they are trying to produce for this niche market. Right now, most can sell all they produce, especially if they utilize farmers' markets. We hope these figures can be used to help others work out business plans and to set realistic production and sales goals.

References

Bruce Clement, UNH Cooperative Extension, handout from Vermont Grass Farmers' Association conference, February 1999.

Mike Ghia, Ewetopia Sheep Dairy, handout from Introduction to Sheep Dairying workshops, January 1999, 2000, 2001.

Suggested Readings

Developing the Farmstead Goat Cheese Business in Wisconsin by Sara T. Bredesen, funded by the Wisconsin Department of Agriculture, Trade and Consumer Protection-Marketing Division, September 2000.