

Case Study for a Seasonal Pasture-based Dairy Farm (using PLMS Ver. 1.2.2.04)

2/25/04 Gordon Groover Virginia Tech© 2004

Situation: This is a hypothetically farm in the Valley of Virginia, the farm has fenced, water lines, roads and cow lanes, milk parlor (which can accommodate 100 cows), feed tanks, and waste management facilities have been placed on the farm (see Figure 2 and Tables 5 and 7 for a full description of all investments in the farm).

Summary of Resources and Assumptions:

Farm information: File name, farm contact information, and climate data (see Figure 1).

Farm layout: Figure 2 shows the farm detailing all land-based resources and investments. There are ten 26-acre fields (total farm acreage 260).

Field: Acreage, soil type, slope, and aspect (potential for splitting existing fields) current crops and land use see Table 1 and Figure 2.

Livestock: 100 cows lactating, weights 1,300 lbs, all cows calve in March, the farm sells 17,550 lbs of milk per cow, cows are in milk 305 days, cull rates (cows 35% and heifers 15%), and all fields are in the grazing system (see Table 2).

Feeding System: All cows and heifers are grazed and feed hay to meet their daily forage demand. Lactating cows (see Table 3) and heifers (see Table 4) are supplement with an 81% TDN feed. Supplement for lactating animals is fed in the parlor (see Table 2).

Designing a grazing system

1. Enter baseline-grazing system for the 100-cow seasonal farm as described above, starting with 10 fields and 100 cows.
2. Try alternatives to solve the summer slump caused by having all cool season species for the 10 paddocks scenario.

Edit Farm Dialog

Farm Name:

Client Information

Street Address:

City:

County:

State:

Zip:

Climate Information

Season Length: days

avg. Winter Temp: deg. F

avg. July Temp: deg. F

Figure 1: Base information

Table 1: Initial field Information for Baseline (file name = Dairy 10 fields)

Field Name	Acres	Surface pH	Forage Crop	Aspect	Slope %
1.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	11
2.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	5
3.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	11
4.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	5
5.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	16
6.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	6
7.0	26	6.8	R.CLOV-T.FESC	Southerly	23
8.0	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	7
9.0	26	6.8	R.CLOV-T.FESC	Southerly	23
10.1	26	6.8	L.CLOV-R.CLOV-ORCH	Southerly	7
Total	260				

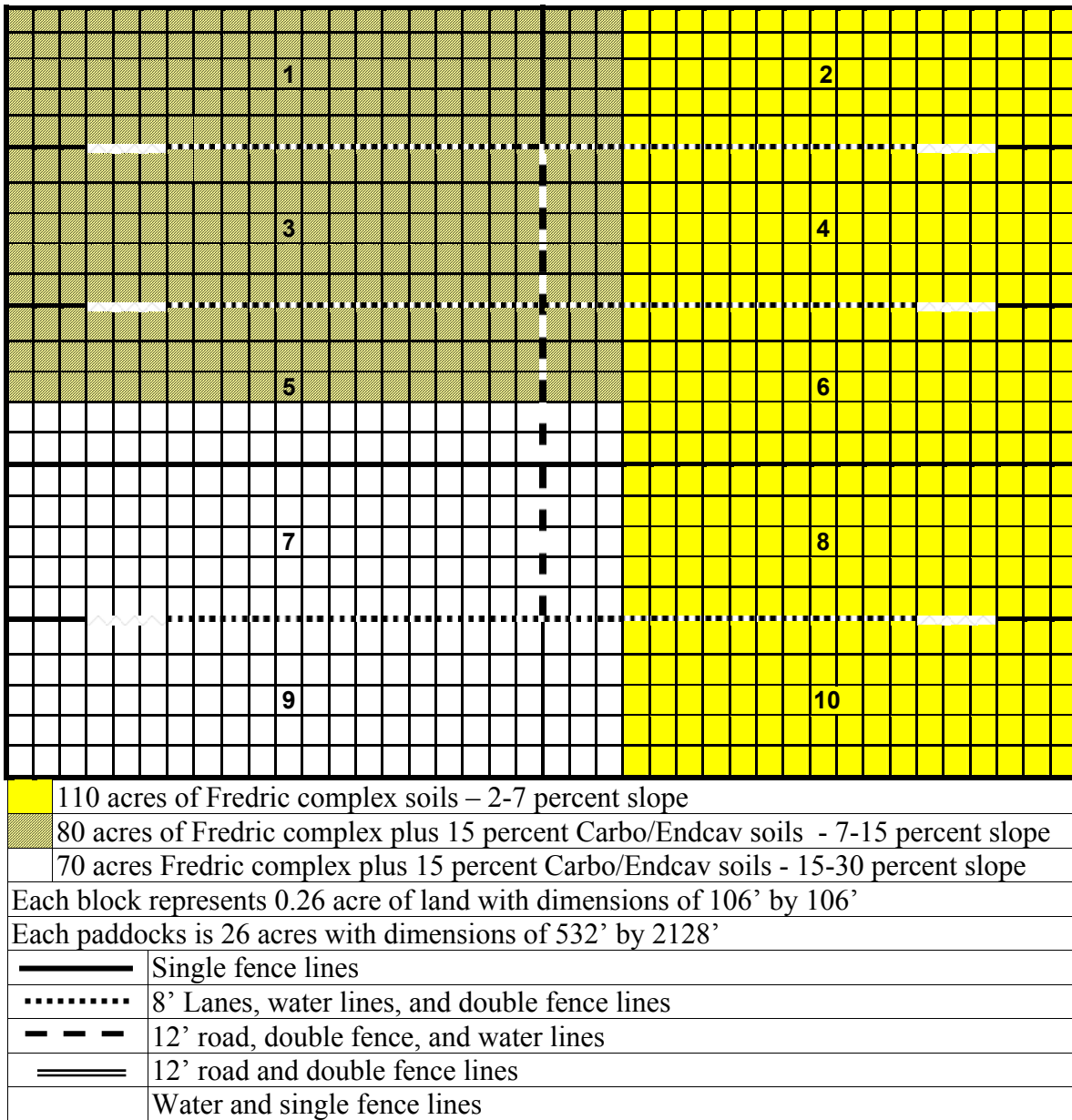


Figure 2: Soil types and land use for the 100-cow intensive pasture dairy on 260 acres

Table 2: 100-cow Model Farm Characteristics (annual factors unless noted)

Items	Values
Target pasture use as a % of total dry matter consumed during the grazing season	65%
Average number of cows in milk for 305 days (Hd.)	100
Production months	March-December
Percentage of cows culled for production and/or health reasons	9%
Percentage of cows sold as replacement (not meeting breeding window)	26%
Culling rate for all heifers	15%
Bred heifers sold (Hd.)	0
Purchased replacements (Hd.)	5
Milk sold per cow (Lbs.)	17,550
Milk price (\$/cwt.)	15.54
Labor	
Family labor FTE	1.25
Hired labor FTE ²	1.7
Rations and feeding systems	
Lactating herd ration (days 1-89 and days 274-365)	Hay and 12%/16% concentrates fed in parlor - dry in Jan-Feb
Lactating herd ration (day-90 to day-273)	65% DM from pasture and 12%/16% concentrates fed in parlor
Heifers ration (days 1-89 and days 274-365)	Hay and supplements
Heifers ration (day-90 to day-273)	Pasture and supplements
Feed storage structures	Hay sheds and concentrate bins
Facilities and waste handling	
Cows housing	None, cows on pasture year-round
Heifer housing	Group barn/mob feeding
Milk Parlor	Double-6 herringbone semi-automatic parlor, working-pens, and 4-pen sick area
Waste storage (days)	29 days
Waste application	Low pressure waste irrigator
Fencing, roads/cow lanes, and water lines	
3-wire perimeter fence (feet)	13,832
2-wire cross fence (feet)	30,322
Farm roads and cow lanes (square feet)	93,462
Additional water lines to pastures (feet)	11,826
Total acres	260
² Based 600,000 lbs of milk sold per worker	

Table 3: Supplementation Rates for Pasture-Based Milk Production by Season

Lbs of 4% FCM ¹ /day	Spring & Fall	Summer
	Lbs of concentrate fed per day	
>80	20	25-27
70	16-18	21-23
60	12-14	15-18
50	8-10	10-12
<40	6-8	8-10

Source: Muller, L. Grazing Dairy Cattle, Proceedings of Great Lakes Grazing Conference, 1998.

¹Fat Corrected Milk.

Table 4: Supplementation Rates for Heifers on Pasture and Hay Feeding¹

Heifers Weight Lbs	Grazing Season - Lbs/Day Of 12 Percent Concentrate	Winter Feeding - Lbs/Day Of 16 Percent Concentrate
300 to 500	3.0	2.5
500 to 800	1.5	3.0
Bred Heifers >800	1.0	6.0

¹Winston, D., (2001) personal conversation.

Assets: The 100-cow seasonal grazing farm January 1, 1999 current, intermediate, and long term assets are detailed in Tables 5, 6 and 7, also listed are the assumptions used in the valuation process.

Table 5. Current Assets - January 1

Assets	Value	Assumptions
Cash and checking balance	\$5,245	Cash balance equivalent to 1 weeks gross milk sales
Accounts receivable	\$0	Dairy is shutdown
Concentrate feed on hand	\$1,032	6 tons of concentrate
Hay	\$8,400	120 tons at \$70/ton = 7 months of hay fed annually
Heifer calves 500-800 lbs	\$26,400	48 head average 550 lbs at \$1.00/lb
Total Current Assets	\$41,077	

Table 6. Intermediate Assets - January 1

Assets	Value	Assumptions/References
Bred heifers 800-1,200 lbs	\$49,200	41 head at \$1,200/head
Early lactation cows	\$70,000	50 head at \$1,400/head
Late lactation cows	42,500	50 head at \$850/head
60-hp tractor	\$24,061	VCE-Pub 446-047, p. appendix ii
Front-end loader	\$4,000	SDSM, p. 7-21
40-hp tractor	\$17,443	VCE-Pub 446-047, p. appendix ii
6 ft scraper	\$700	SDSM, p. 10-55
Manure spreader 200 ft ³	\$5,190	Spreading waste from heifer barn SDSM p. 10-55
Mower-conditioner 9'	\$11,900	VCE-Pub 446-047 appendix iii
2-bale spears	\$550	Tractor Supply Company local flyer
Hay rake 9'	\$3,890	VCE-Pub 446-047 appendix iii
Round baler 800#	\$13,933	VCE-Pub 446-047 appendix iii
2 Utility wagons	\$5,100	Tractor Supply Company, local flyer
Rotary mower 10.5'	\$5,809	VCE-Pub 446-047 appendix iii
1 off-road Utility Vehicle	\$6,000	http://www.greeneimp.com/gator.htm (10/15/2000)
¾ ton pickup truck 2 WD	\$22,000	Local advertisement
Spin spreader 11.5 ft ³	\$550	http://www.wikco.com/Vanderwm.html 11/21/2000)
25kwk PTO generator	\$3,000	SDSM p. 9-35
Office Furniture, and Fax	\$1,205	SDSM p. 2-12
Computer, software, fax & printer	\$3,000	SDSM p. 2-12
10 Portable waters	\$1,300	Local advertisement
20 round bale feeders	\$3,000	SDSM p. 6-69
200 ft of portable feed trough	\$1,200	SDSM p. 6-69
20 rolls polywire 600 feet/roll	\$1,600	Faulkner, D., 1999 (FOCS Cost List Index No. 24EWC)
500 fiberglass posts (1 every 25')	\$800	Faulkner, D., 1999 (FOCS Cost List Index No. 24EWC)
Electric fence charger	\$500	Faulkner, D., 1999 (FOCS Cost List Index No. 29EWC)
Low pressure waste irrigator	\$5,500	Irrigator, 10 Hp motor, and pump (Alpha Ag, Inc, http://www.alphaag.com/ 11/21/2000)
2" drag hose for irrigator	\$358	650 ft 2" (Alpha Ag, Inc,)
Farm Credit Stock	\$4,446	1% of loan value
Total Intermediate Assets	\$308,735	

Table 7. Long Term Assets - January 1

Assets	Value	Assumptions/References
Cropland - 110 acres at \$1,950/ac	\$214,500	Doane's, 1999, Report 61.
Pasture/hay land- 150 acres at \$1,870/ac	\$280,500	Doane's, 1999, Report 61.
Site development	\$27,456	Electrical service (\$2,750), security light (\$600), 1,500 ft ² concrete pad (\$4,860), 2000 ft ² of gravel parking lot (\$560), well and water system for facilities (\$7,775), land clearing and grading (\$3,911), environmental audit (\$2,500), survey (\$2,000), and legal work (\$2,500). SDSM p. 3-21.
Farm roads and cow lanes	\$26,169	93,462 ft ² Faulkner, D., 1999 (FOCS Cost List Index No. 50E)
Water lines to pastures	\$11,353	11,826 ft, Faulkner, D. 2000, (Carroll County Case Study, VA p. 43)
9-ton bin and auger - cows	\$1,600	SDSM, p. 4-10
3-ton bin and auger – cows and heifers	\$900	SDSM, p. 4-10
Flex augers and feeding equipment for parlor	\$8,500	SDSM, p. 4-18
Hay shed 210 tons and machine storage	\$17,280	SDSM, p. 7-24 (size 40' x 96' x 17')
Heifer group barn and hay storage	\$8,352	SDSM, p. 6-59 (size 1,856 ft ²)
4-pen treatment and working pens	\$12,000	SDSM, p. 8-23
Conventional exit semi-auto double 6 herringbone parlor	\$103,931	SDSM, p. 9-39
Bulk tank & coolers	\$28,750	SDSM, p. 9-39
Concrete waste tank	\$12,439	29 days of parlor waste 2,412 ft ³ (18,093 gals) Based on DCR, 1995 (costs two local contractors 11/2000)
3" PVC pipe for waste water – installed	\$662	350 ft (Faulkner, D., 1999 (FOCS Cost List Index No. 753 and 74E)
10 Permanent waters	\$6,000	Faulkner, D., 1999 (FOCS Cost List Index No. 115E, CP22, & CREP and 116 CP22& CREP)
13,832 ft of 3 strand HT fence	\$16,045	Perimeter fence - based on 10 paddocks (532 ft by 2,128ft), 26 acres per paddock. Faulkner, D., 1999 (FOCS Cost List Index No. 26EW&C)
30,303 ft of 2 strand HT fence	\$26,969	Cross fence. Faulkner, D., 1999 (FOCS Cost List Index No. 25EW&C)
Total Long Term Assets	803,406	
Total Assets	\$1,153,218	