

What's the Value of High Quality Forage?

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On my travels around farms this winter, I've noticed a wide variation in what farmers are feeding for grain. The quality and of course price have ranged anywhere from a 12% protein mix costing \$300/ton, to high-protein mixes costing over \$400/ton. This really affects the farm's yearly income. For example, 50 milking cows eating 15 lbs grain per day, paying \$100 per ton more for grain will cost an additional \$8,000 over a typical winter. That's not pocket change!

So what was the major difference between these farms? The farms feeding cheaper grain had put up higher-quality forage, even in a tough cropping summer. Their feed tested over 16% crude protein, with good energy and digestibility (45-50% NDF on the forage test). The cows made milk on good homegrown forage, instead of pricy organic grain. So, what does it take to make good quality forage, year after year? The basics to producing high quality feed include a combination of good management practices and of course good fortune. I am sure we all remember how difficult it was to make high quality forage last year! Forage can lose 10 to 20 % of its CP and digestibility if it is damaged by rain. However, since we can not control the weather we should focus on the things we do have control over. Listed below are some of the key management factors influencing forage yield and quality.

1. **Getting forage harvested on time is the first principle in producing good-quality forage.** As plants mature, go to head, and then flower, the forage increases in fiber, reducing the CP and digestible dry matter content of the resulting hay. Hay digestibility decreases between 0.33 and 0.50 percentage points per day. The optimum harvest date will vary across the state so watch the growth stage of the grasses to determine when to start making first cut hay. Hay should be cut when grass is in the late-boot to early-head growth stage. This stage provides the best compromise between yield and quality. This usually means late May here in Vermont for 1st cut. Later harvests should be made based on the growth stage of the legume. For highest quality, harvest when the legume is in the late-bud growth date.
2. **Providing plants with the proper nutrition is critical to high yield and quality.** Maintaining adequate soil fertility will start with soil testing. If some fields have high fertility and some are low, focus on the low ones first. Soil pH must be cor-

rected to at least 6.5 for alfalfa, 6.2 for red clover. Potassium is the most important nutrient for stand maintenance and yield retention. Phosphorus is very important in stand establishment. Don't forget to pay attention to neglected nutrients like calcium, sulfur, and boron. Manure, compost, and mineral applications can address immediate nutrient needs and build organic matter for longer term nutrient supply.

3. **Including legumes such as clover, alfalfa, or birds-foot trefoil in your forage stands.** Old grass hay-fields, even with manure applied, can lose yield and quality as less favorable forage species take over. You know those fields – where you have to rake together several windrows to get enough for the baler, and the hay only tests 12% protein. Seeding legumes into these fields can improve yield and quality of your forages. In general a legume/grass stand having 25 – 50 % legume, will provide grass with up to 150 lb/acre of actual N. First, legumes “fix” nitrogen from the air and make it available to the grasses, often increasing grass yields. Legumes can also increase the feed value by improving protein, energy, and digestibility. And a legume-grass mix lengthens the harvest window for hay, since legumes generally mature later than grasses.

So, what are the costs and benefits you might expect from improving hay fields? Heather Darby from UVM Extension and I looked at 3 different options for managing crop fields: low-input, frost seeding (see the February 2005 NODPA News for more information), and crop rotation. The values to produce the figures were adapted from published Northeast custom-hire rates, local seed and fertilizer costs, and our own best estimates. This figures only consider direct costs, and do not include fixed costs like land ownership or rent. We hope this is ‘food for thought’ as you think about the upcoming cropping season.

Option #1: Permanent Grass Hay – the ‘basic’ option: 2 cuts per year, 1 cut wrapped silage, 1 cut dry hay. Yield is 2.5 tons/acre. No new seed, manure as fertilizer.

Option #2: Frost-seeding - the “low-input” option: clover frost-seeded every other year. Yield is 3 tons/acre. Manure and lime as soil amendments.

Option #3: A 6-year crop rotation: 2 years corn silage, 4 years hay with a field peas and oats nurse crop in the seeding year.

Interestingly, if organic protein costs \$0.80/lb (\$730 per ton for 46% soybean meal) then every 1% increase in forage protein content will be worth \$16/T (2000 lbs x 1% x .80). Therefore in option #2, increasing the hay protein by over 3% per ton, even without any yield increase, is profitable. If no lime is needed, a 1% increase in hay protein content would be profitable. Also, the net increase

with just new hay seedings in option #3 (no corn silage) would be 11%.

Although including corn silage in a crop rotation can reduce off-farm energy purchases it will not fit into every farm's cropping system. Growing corn adds some complexity to the cropping system. Certainly there is an additional equipment and time requirement that comes with growing corn. In addition, for those have not grown corn organically there is a learning curve to managing weeds and fertility. If you are interested in adding annual crops to the rotation consider trying small acreages initially.

As grain prices increase and availability it is important to consider the potential of producing higher quality forages on your own farm. Ultimately, improving forage quality and yield will improve your bottom line. In both the frost-seeding and crop rotation options, it seems that improving hayfields should be worthwhile and profitable. But there is always risk in farming - if you do not get the yield or hay quality increases, you may lose money. Remember that these numbers are averages; you will find better figures for your own farm by doing a little experimenting with your cropping. If you would like these spreadsheets emailed to you to help do your own budgeting, email me at nsbacon@yahoo.com.

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Income:	2.5 T hay	3 T hay	3 T hay	Notes
Hay	\$287.50	\$345.00	\$345.00	Hay @\$115/ton
Peas/oats silage			\$37.50	1.5 T/A @\$100/T, in seed-
Total income	\$287.50	\$345.00	\$382.50	
Direct Expenses:				
Clover frost seed		\$6.25		5 lbs clover, 2.50/lb, seeded every other yr
Forage Seed			\$15.00	20-lb seeding, \$3/lb, over 4 years
Nurse crop seed			\$10.80	120 lbs/A peas/oats @\$18/bag
Lime		\$21.33	\$21.33	2 T/A, spread every 3rd
Manure spreading	\$33.00	\$33.00	\$33.00	estimate from custom
Plow rye			\$3.70	\$14.80/A, amortized over
Harrow			\$7.95	3X @ 10.60/pass, over 4
Seeding		\$4.10	\$3.55	\$14.20/A, amortized over
Mowing	\$22.00	\$22.00	\$22.00	2X at \$11/A
Raking & tedding	\$19.80	\$19.80	\$19.80	3X at \$6.60/A
Baling	\$46.50	\$57.00	\$57.00	\$6.20/bale
Bale wrapping	\$29.00	\$36.00	\$36.00	\$5.80/bale
Total expenses:	\$150.30	\$199.48	\$230.13	
Income - expenses (net/acre)	\$137.20	\$145.52	\$152.37	
Organic corn silage				
Income:				
Corn silage			\$450.00	12 T/A \$37.50/T
Direct Expenses				
Corn seed			\$40.00	\$100/bag, 2.5 acres/bag
Winter rye/vetch seed			\$42.00	90 lbs rye/vetch year 1, 100 lbs rye year 2
Lime			\$21.33	2 T/A, spread every 3rd
Manure spreading			\$33.00	estimate from custom
Plow rye			\$14.80	
Harrow			\$31.80	3X @ \$10.60/pass
Plant corn			\$13.30	
Cultivate			\$28.80	3X @ \$9.60/pass
Chop, haul and fill silo			\$90.00	12 tons/A @\$7.50/ton
Seed cover crop			\$8.20	
Total expenses			\$323.23	
Income - expenses (net/acre)			\$126.77	
Average net for 6-year rotation	\$137.20	\$145.52	\$143.92	
% increase from option #1		6%	5%	