

**Hay Production, Harvest and Storage Costs, Round Bales:** Estimated annual operating and fixed cost per one ton of usable hay on a dry matter basis (approximately 1.2 tons of hay at 85% dry matter) under alternative hay storage systems. Loading out or feeding out costs are not included. **Enter your own data in the highlighted cells.**

**INPUT DATA AND EXPLANATORY NOTES**

ITEM	COST/UNIT	UNIT	COMMENTS
Pasture cost (Example from NCSU forage budget 87-1)	\$64.27	per ton of DM	Pro-rated cost per ton of dry matter
Haymaking cost (Example from NCSU budget 84-2)	\$77.85	per ton of DM	
Additional cost of wrap compared to twine, material only	\$0.85	per ton of DM	Estimated by authors as wrap cost of \$0.73 per bale *2.9 bales/ton.
Adjusted hay making cost	\$78.70	per ton of DM	Calculated
Average bale weight, lb of dry matter	688	lb of DM	
Bale width, nominal	5.0	feet	
Bale diameter, nominal	4.0	feet	
Allowance for gaps and settling, % of nominal bale footprint	10%	%	
Effective bale "footprint" for storage costs	22.00	square feet	Calculated as width X diameter X (1 + (Allowance/100))
Ground storage "facilities:"			
--Site prep area, sq ft	1,200	square feet	Estimated by authors at 45 min/1200 sq. ft. site area. Includes travel and equipment set up time.
--Time to prepare site, including travel time to site, hours	0.75	hours	
--Site prep equipment cost, ownership & operating	\$18.00	\$ per hour	Bushog + tractor. Full economic cost taken from NCSU forage budget 87-2, tables 1 and 2.
--Site prep for ground storage: time per sq ft	0.00063	hours/sq ft	Calculated
--Site prep for ground storage: equipment & labor cost per sq ft.	\$0.017	\$/sq ft	Calculated
Pallet storage:			Used with ground storage and barn storage
--Pallet, used,	\$0.150	\$/sq ft	\$5 each at farm, used for two hay crops. Data from <a href="http://www.recycle.net/exchange/">http://www.recycle.net/exchange/</a>
--Pallet, set up labor	0.00083	hours/sq ft	Estimated by authors based on 60 min for a 1200 sq ft. site, including travel time to site.
--Total cost of pallet	\$0.1578	\$/sq. foot	Calculated
Bale Cover:			Used with ground storage
--Tarpaulin	\$0.04	per sq. foot	8 cents/sq ft., used for two hay crops. Source: various web sites
--Tarpaulin, labor to set the cover	0.050	hours/ton DM	Estimated by authors. Includes travel time. 30 min for 2 people for a 20 ton stack.
--Ground area, average square feet per stacked bale	11.00	square feet	Stacked in a pyramid of three bales at the base = half of the single bale footprint
--Tarpaulin area, square feet per bale	21.00	square feet	Estimated by the authors
Barn storage:			
--Hay Barn, investment cost	\$7.50	\$/sq. ft	Estimated new cost by authors. 14-month storage incurs a 1.5 year charge.
--Useful life of structure (physical, economic or planning horizon)	15	years	
--Salvage value at end of useful Life, if any, \$	\$0.00	\$/sq. ft	
--Depreciation charge, average, \$ per year	\$0.500	\$/sq. ft	Calculated
--Interest rate on investment, % per year	7.5%	%	
--Interest charge, average, \$ per year	\$0.28	\$/sq. ft	Calculated on the average investment
--Tax and insurance rate, % per year	1.4%	%	
--Tax and insurance, \$ per year	\$0.053	\$/sq. ft	Calculated on the average investment
--Total barn ownership cost, \$ per square foot per year	\$0.834	\$/sq. ft	Calculated
--Barn maintenance cost, annual, % of initial cost	1.0%	%	One percent of the new cost per year
--Barn maintenance cost, \$ per year	\$0.075	\$/sq. ft	
--Total barn ownership and maintenance cost, \$ per square foot per year	\$0.909	\$/sq. ft	
--Ground area, average square feet per stacked bale	8.14	square feet	
--Added time to move and stack hay in barn	0.30	hours/ton DM	Estimated by authors at twice the amount in the NCSU hay budget
--Added equipment cost to transport hay to barn, \$ per ton of DM	\$4.21	\$ per ton DM	Estimated by authors at twice the amount in the NCSU hay budget
Wage rate for all labor, hired or family, \$/hour	\$9.40	\$ per hour	Wage rate used in NCSU budgets. Source: "Farm Labor," NASS, USDA, Nov. 2006 Appalachian 1 Region, Field and Livestock Workers, hourly wage of \$8.90.

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**ENTERPRISE COST ESTIMATES**

**8-month storage**

Treatment	Standing Hay Crop Cost	Haymaking Cost	Hay cost in field	Storage Facility	Storage Area Needed	Cover	Storage Facility Cost	Labor Cost	Add Labor to Move/Cover	Equipment to Move	Hay Cost in Storage	Total Losses <sup>a</sup>	Usable Hay Cost <sup>b</sup>
	\$/ton DM	\$/ton DM	\$/ton DM	\$/sq ft	Sq. ft./ton DM	Sq. ft./ton DM	\$/ton DM	\$/hour	\$/ton DM	\$/ton DM	\$/ton DM	%	\$/ton DM
Ground Uncovered	\$64.27	\$78.70	\$142.97	\$0.017	63.95	--	1.095	\$9.40	0.000	incl	\$144.07	22.7%	\$186.37
Pallets Uncovered	\$64.27	\$78.70	\$142.97	\$0.175	63.95	--	11.189	\$9.40	0.000	incl	\$154.16	22.7%	\$199.43
Ground Covered	\$64.27	\$78.70	\$142.97	\$0.017	31.98	61.05	2.989	\$9.40	0.470	incl	\$146.43	10.0%	\$162.70
Pallets Covered	\$64.27	\$78.70	\$142.97	\$0.175	31.98	61.05	8.036	\$9.40	0.470	incl	\$151.48	10.0%	\$168.31
Barn (cost for 12 mo.) <sup>c</sup>	\$64.27	\$78.70	\$142.97	\$1.067	23.66	--	25.238	\$9.40	2.820	\$4.210	\$175.24	2.7%	\$180.10

**14-month storage**

Treatment	Standing Hay Crop Cost	Haymaking Cost	Hay cost in field	Storage Facility	Area Needed	Cover	Storage Facility Cost	Labor Cost	Add Labor to Move/Cover	Equipment to Move	Hay Cost in Storage	Total Losses <sup>a</sup>	Usable Hay Cost <sup>b</sup>
	\$/ton DM	\$/ton DM	\$/ton DM	\$/sq ft	Sq. ft./ton DM	Sq. ft./ton DM	\$/ton DM	\$/hour	\$/ton DM	\$/ton DM	\$/ton DM	%	\$/ton DM
Ground Uncovered	\$64.27	\$78.70	\$142.97	\$0.017	63.95	--	1.095	\$9.40	0.000	incl	\$144.07	30.7%	\$207.89
Pallets Uncovered	\$64.27	\$78.70	\$142.97	\$0.175	63.95	--	11.189	\$9.40	0.000	incl	\$154.16	30.7%	\$222.45
Ground Covered	\$64.27	\$78.70	\$142.97	\$0.017	31.98	61.05	2.989	\$9.40	0.470	incl	\$146.43	19.3%	\$181.45
Pallets Covered	\$64.27	\$78.70	\$142.97	\$0.175	31.98	61.05	8.036	\$9.40	0.470	incl	\$151.48	11.1%	\$170.39
Barn (cost for 18 mo.) <sup>c</sup>	\$64.27	\$78.70	\$142.97	\$1.067	23.66	--	37.857	\$9.40	2.820	\$4.210	\$187.86	11.1%	\$211.31

<sup>a</sup> Losses include shrinkage and spoilage of the outside layer of the bale. Examples given are based on research results from the Mountain Research Station, NC.

<sup>b</sup> To convert dry matter cost to actual cost per ton of hay multiply the DM cost shown in the table by the dry matter content of the hay. E.g., \$186.37 X 0.85 = \$158.41/ton of hay.

<sup>c</sup> Include variable costs for barn maintenance. Add either total fixed cost for a new structure or alternative use value for an existing barn. Pro-rate cost if barn is also used for other purposes.