

NC AGRICULTURE COST SHARE PROGRAM | TECHNICAL REVIEW COMMITTEE

Biochar Soil Carbon Amendment: Moving the Cost List to a Cubic Yard Basis

Proposed rate and supporting supplier data
NC Division of Soil and Water Conservation · September 2026

What the Committee asked for

And what this presentation provides

- 1 The request** Express the biochar cost list on a per ton or cubic yard basis rather than a flat per acre rate.
- 2 The recommendation** Cubic yards. Weight is not a reliable unit for this material, and USDA-ARS has independently reached the same conclusion.
- 3 The proposed rate** \$160.00 per cubic yard, producing a 75% cost share payment of \$120.00 per cubic yard.
- 4 The caveat** Supplier pricing is not settled. The Division expects to return with revised figures as producer invoices accumulate.

Why cubic yards, not tons

Three findings, none of them originating with the Division

Biochar absorbs water

USDA-ARS confirms biochar is hygroscopic. Volume stays constant while weight fluctuates with moisture and storage. ARS states directly that purchasing by the cubic yard produces a more accurate application rate.

We have a NC case

Delivery tickets from a western NC producer last fall showed roughly 2.5 cubic yards per ton. Dried ARS analysis of the same material showed 6.0 cubic yards per dry ton. The difference is water.

Suppliers do not agree on units

Of eleven suppliers contacted, some quote by the cubic yard, some by the delivered ton, one by the bone dry ton. A volumetric list removes the conversion from the transaction.

The conversion standard

USDA-ARS Coastal Plains Soil, Water and Plant Research Center, Florence SC

Baseline values developed from a 23 entry literature review combined with North Carolina field samples. Wood, agricultural residue and grass feedstocks showed no statistically significant difference and are grouped as cellulosic.

Feedstock class	g/cm ³	lb per CY	CY per dry ton
Cellulosic (wood, ag residue, grass)	0.20	337	6.0
Manure derived	0.40	674	3.0

Bulk density must be determined on a dry weight basis, 105 °C for 24 hours. Material measured wet reports an artificially high density and less biochar reaches the field.

6.0

cubic yards per dry ton

The single conversion factor a district planner needs for woody biochar. A 4 ton per acre prescription becomes 24 cubic yards per acre.

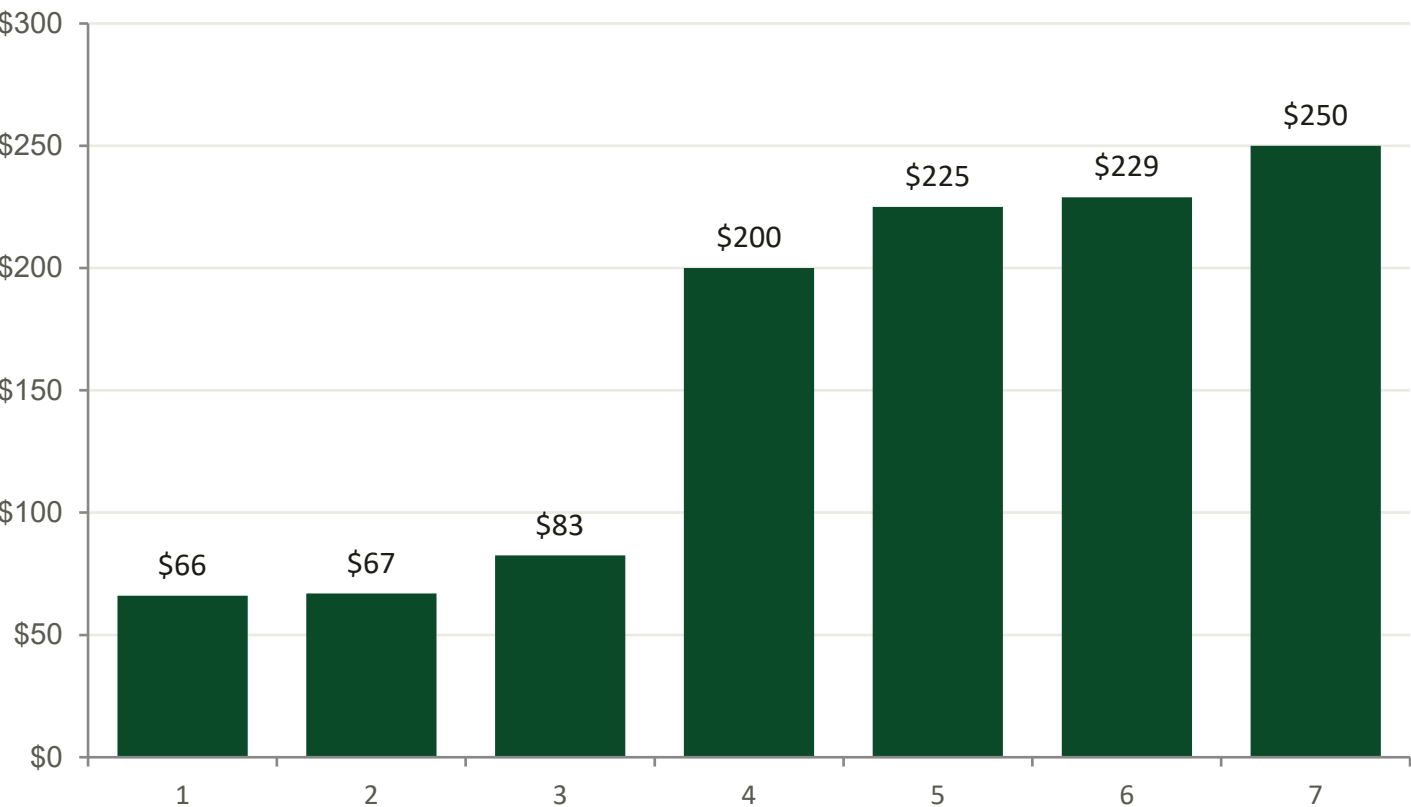
Supplier data collected

Eleven suppliers contacted, nine provided pricing

Supplier	Product	As quoted	\$ per CY	How the CY figure was obtained
1	Woody biomass	\$200/ton W&C; \$225/ton E	\$66 – \$75	Supplier confirmed 14.4 lb/ft ³ dry
2	Forest residue	\$300 – \$500 / bone dry ton	\$50 – \$84	Derived at ARS baseline
3	Mill residual	\$200/ton delivered	\$82.50	Quoted directly
4	Storm debris hardwood	\$200/CY + \$6 per loaded mile	\$200 +	Quoted directly
5	Certified forest wood	\$200 – \$250/CY delivered	\$200 – \$250	Quoted directly
6	Virgin hardwood	\$210/CY FOB + freight	\$210 – \$229	Quoted directly; 104 CY minimum
7	Riparian hardwood	\$200 – \$300/CY, four distance bands	\$200 – \$300	Quoted directly
8	Swine manure	\$300/ton FOB	\$101 – \$134	phosphorus limited
9	Bagged, 3 cu ft	\$50 per bag	\$450	Small area rows only

The market is bimodal

Seven woody biochar suppliers, delivered cost per cubic yard



\$66 – \$83

Three suppliers. National companies deliver into North Carolina in this band.

\$200 – \$250

Four suppliers, including both North Carolina producers. No supplier is priced between the two bands.

The Division cannot explain the split

Scale, geography and feedstock all cut across both price bands

The largest biochar facility in the United States. Over 200,000 metric tons of annual capacity on a \$300 million investment. Delivered price into North Carolina: \$200 to \$250 per cubic yard, the same band as the two western NC storm debris producers.

Producer scale does not explain the split.

Candidate explanations, none confirmed

Product grade

The upper band is uniformly high carbon and low ash. One company is an exception at 79.8% carbon and a low price.

Market positioning

Another sells biocarbon as a metallurgical coal replacement; Another sells a premium horticultural product. Both may be priced against those markets.

Moisture and handling

Some material is stored outside at 41.5% moisture, Others at 50 to 60%. Drier material carries handling cost.

Because we cannot determine which band represents the market a North Carolina producer will actually buy in, the Division does not recommend building the rate from either band alone.

RECOMMENDATION

\$160.00 per cubic yard

Maximum 75 percent cost share payment of \$120.00
per cubic yard

Derived as the mean of all seven woody biochar suppliers

Mean \$159 · Median \$200 · Rounded to \$160 for the list

Why the full market average

The case for \$160, and what it depends on

- **It does not require choosing a band**

The split is real but unexplained. Building the rate from either band alone would commit the program to an assumption about the market that the Division cannot currently support.

- **No eligible producer is left far short**

Cost share coverage ranges from roughly half to full cost. A rate built on the lower band would leave producers buying North Carolina material at about a quarter of their cost.

- **It supports in-state supply without setting a floor**

North Carolina producers are covered at roughly 60 percent, meaningful support without the state signalling that \$250 per cubic yard is a normal price in a market this young.

- **It moves easily in either direction**

Starting from the middle means the first revision can go up or down on evidence. A rate set at either extreme is harder to move without appearing to correct an error.

Proposed cost list

Blend ratios and the 75 percent cost share carried forward unchanged from the current draft

Component	Unit	Unit Cost	Maximum 75% Cost Share
Biochar	CY	\$160.00	\$120.00
Biochar/Compost (>50% biochar)	CY	\$82.79	\$62.09
Compost/Biochar (33% to 50% biochar)	CY	\$72.50	\$54.38
Biochar (<10,000 SqFt)	CY	\$450.00	\$337.50
Biochar/Compost (>50%) (<10,000 SqFt)	CY	\$232.85	\$174.64
Compost/Biochar (33% to 50%) (<10,000 SqFt)	CY	\$203.91	\$152.93

Small area rates reflect bagged retail purchase. The \$450 straight biochar figure comes from the one North Carolina bagged quote received and is corroborated by national retail: A national biochar producer sells a 1 cu ft bag at \$21.40, equal to \$578 per cubic yard, against \$75 per cubic yard bulk. The two small area blend rates are derived from the bulk ratios and are not supported by a bagged blend quote.

What the rate covers

Maximum payment of \$120.00 per CY as a percentage of each supplier’s delivered cost

Supplier	Delivered \$ per CY	Coverage at \$120.00
1	~\$66	182%
2	~\$67	179%
3	~\$75	160%
4	~\$200	60%
5	~\$225	53%
6	~\$229	52%
7	~\$250	48%

No rate meets the 75 percent target across a four fold price range. This is the honest trade off: with an actual cost ceiling in place, lower band purchases are fully covered and upper band purchases receive roughly half. A rate built on the lower band would leave upper band purchases at about a quarter.

This price is not settled, and the list may need revision.

The market is developing

Western North Carolina supply was built on storm debris after Helene and has not been tested by competitive entry.

The federal basis is unknown

NRCS has not provided the cost build up behind the current \$1,418.71 per acre rate despite a Division request.

A cost share rate can become a price floor

In a thin market, suppliers price often to what they know the buyer will be reimbursed. This argues for revisiting the rate rather than setting and leaving it.

The Division will return to the Commission with updated cost data as producer invoices accumulate. Invoices are the first direct evidence of what North Carolina producers actually pay, rather than what suppliers quote.

Requested action

Favorable recommendation on the unit

That the biochar Soil Carbon Amendment cost list be expressed on a cubic yard basis.

Favorable recommendation on the rate

That the rate be set at \$160.00 per cubic yard, with a 75% cost share payment of \$120.00 per cubic yard.

Acknowledgement that revision is expected

That the Division return with updated cost data as producer invoices accumulate and the supplier market settles.

Other options available to the Committee

Three additional derivations were developed and can be presented in full on request

Basis	Rate / CY	Payment / CY	\$ per acre at 4 tons	vs. NRCS rate
Lower price band	\$70	\$52.50	\$1,260	89%
Federal alignment	\$80	\$60.00	\$1,440	101%
Full market average (recommended)	\$160	\$120.00	\$2,880	203%
Upper price band	\$225	\$168.75	\$4,050	285%

Lower price band	Assumes producers buy the least expensive eligible material. The only option that never exceeds actual cost, but leaves North Carolina purchases at about a quarter of cost.
Federal alignment	Back calculated from the NRCS rate at 4 tons per acre. Matches federal purchasing power, but rests on an assumption NRCS has not confirmed.
Upper price band	Covers North Carolina and premium supply at close to 75 percent. Pays two to two and a half times actual cost for lower band material and reduces acreage reach substantially.