

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**WASTE UTILIZATION
(Acre)
CODE 633**

DEFINITION

Using agriculture waste such as manure and waste water or other organic residues.

PURPOSES

- Protect water quality
- Provide fertility for crop, forage, fiber and forest products production
- Improve or maintain soil structure
- Provide a source of energy

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where agriculture wastes, including animal manure and contaminated water from livestock and poultry operations; solids and waste water from municipal treatment plants; and agriculture processing residue are generated, and or utilized.

CRITERIA

General Criteria Applicable to All Purposes

All federal, state and local laws, rules and regulations governing waste management, pollution abatement,

health and safety shall be strictly adhered to. The owner or operator shall be responsible for securing any and all required permits or approvals related to waste utilization and for operating and maintaining any components in accordance with applicable laws and regulations.

Use of agricultural wastes shall be based on an annual analysis of the material during the time it is to be used. In the case of daily spreading, the waste shall be sampled at least once each year. As a minimum, the waste analysis should identify moisture content and N, P and K concentrations. Where the metal content of municipal waste water, sewage sludge, septage and other agricultural waste is a concern, the analysis shall also include determining the concentration of metals in the material.

Preliminary design and planning decisions may be based on “book values” acceptable to NRCS and/or LCES if they accurately estimate the amount and content of the waste material produced. Book values recognized by NRCS may be found in the Agricultural Waste Management Field Handbook, Chapter 4 – Agricultural Waste

Conservation practice standards are reviewed periodically, and updated as needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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Characteristics. Plans shall be adjusted accordingly after wastes have been analyzed.

The planned rate of nitrogen and phosphorus in the final plan shall be determined based on annual laboratory analysis of the material being applied minus adjustments for volatilization, leaching, and denitrification.

Where agriculture wastes are to be spread on land not owned or controlled by the producer, the waste management plan, as a minimum, shall document the amount of waste to be transferred and who will be responsible for the environmentally acceptable use of the waste. In Louisiana, transfer of agriculture waste shall be documented using the Agriculture Waste Transfer Certification Letter (see Exhibit 1 of this standard). Each Agriculture Waste Transfer Certification Letter shall be accompanied by a copy of the Agriculture Waste Land Application Guidelines (Exhibit 2 of this standard).

Records on the use and/or transfer of wastes shall be kept a minimum of three (3) years as discussed in the OPERATION AND MAINTENANCE section of this standard.

Additional Criteria to Protect Water Quality

All agricultural wastes shall be utilized in a manner that minimizes the opportunity for contamination of surface and ground water supplies.

Agricultural waste shall not be applied on soils that are frequently flooded, as defined by the National Cooperative Soil

Survey, during the period when flooding is expected.

When liquid wastes are applied, the application rate shall not exceed the infiltration rate of the soil, and the amount of waste applied shall not exceed the moisture holding capacity of the soil profile at the time of application. Waste shall not be applied to frozen or snow covered soil.

Additional Criteria for Providing Fertility for Crop, Forage, Fiber Production and Forest Products

Where agricultural wastes are utilized to provide fertility for crops, forage, fiber production and forest products, the practice standard Nutrient Management (590) shall be followed.

Where municipal waste water and solids are applied to agricultural lands as a nutrient source, the single application or lifetime limits of heavy metals shall not be exceeded. The concentration of salts shall not exceed the level that will impair seed germination or plant growth.

Additional Criteria for Improving or Maintaining Soil Structure

Where wastes are applied as part of a cropping system for maintaining or improving soil structure, soil incorporation within 72 hours is desirable. Waste shall be applied at rates not to exceed the crop nutrient requirements or salt concentration as stated above.

Additional Criteria for Providing a Source of Energy

Use of agricultural waste for energy production shall be an integral part of the overall waste management system.

All energy producing components of the system shall be included in the waste management plan and provisions for utilization of residues of energy production identified. Where the residues of energy production are to be land applied for use as a crop nutrient or soil conditioning, the criteria listed above apply.

CONSIDERATIONS

The effect of Waste Utilization on the water budget should be considered especially where a shallow ground water table is present or in areas prone to runoff. Limit liquid waste application to the volume that can be stored in the root zone at the time of application.

Minimize the impact of odors of land applied wastes by making applications at times when temperatures are cool and wind direction is away from neighbors or other sensitive areas.

Agricultural wastes contain pathogens and other disease causing organisms. Waste should be utilized in a manner that minimizes their disease potential. Deep stacking or composting of wastes can greatly reduce pathogens and other disease causing organisms and makes the waste less attractive to vectors (insects, rodents etc.)

Application sites on gently sloping land as far as possible from water bodies should be given top priority. When waste are applied on more sloping land or adjacent to water bodies, follow the

minimum set-back distances contained in Exhibit 2 of this standard and install other conservative practices as needed to reduce the potential for off-site transport of waste. It is preferable to apply waste in pastures and hayland soon after haying or grazing before regrowth has occurred.

Nitrogen volatilization can be minimized by soil incorporation of wastes within 24 hours of application.

Minimize the environmental impact of land applied waste by limiting the quantity of waste applied to the rates determined using the practice standard Nutrient Management (590) and the Phosphorus Index for all waste utilization.

Install a Sediment Basin (350) according to practice specifications on cropland where slopes greater than 5 percent are used as disposal sites to allow for temporary storage of runoff so that phosphorus laden sediment will have time to settle out.

Consider removing sludge from lagoons annually. However, sludge must be removed from lagoons at least once every 4 years.

Apply solid waste in a manner so that not more than 20 percent of the leaf surface of plants is covered.

Do not apply animal waste to root crops during the current growing season or to above ground vegetable crops one month prior to harvest.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each field according to the Criteria and Operations and Maintenance described in this standard and recorded in narrative statements in the Conservation/ Waste

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Utilization Plan. The waste management plan shall account for utilization or other disposal of all animal waste produced, and all application areas shall be clearly indicated on a plan map.

OPERATION AND MAINTENANCE

Records shall be kept for a period of 5 years or longer, and include, where appropriate, the items mentioned in Exhibit 2 of this standard.

The operations and maintenance plan shall include date of periodic inspections and maintenance of equipment and facilities used in waste utilization. The plan should also include what is to be inspected or maintained and a general time frame for making necessary repairs.

Refer to the Agricultural Waste Management Field Handbook for information necessary to determine animal waste production.

Use Exhibit 3 of this standard to determine nutrient production and the area needed for land application.

When the PI (Phosphorus Index, 590) is rated as High, limit the quantity of waste applied to the amount of phosphorus removed from the field in the harvested portion of the crop or forage utilized for land application. Refer to Exhibit 4 of this standard.

EXHIBIT 1

AGRICULTURAL WASTE TRANSFER CERTIFICATION LETTER

Name & Address of Producer:

Name & Address of Transferee:

I, _____, Transferee, agree that the _____
(amount, lbs., tons, gallons, yards) of _____ (type of waste) I remove from this site will
be handled and applied in accordance with accepted and approved best management practices, and that all
applicable federal, state and local regulations will be followed in the transportation, storage and land application
of these materials.

I agree to follow the attached Agricultural Waste Land Application Guidelines when applying waste to the land
as a soil amendment.

Signature of Transferee

Date

EXHIBIT 2**AGRICULTURAL WASTE
LAND APPLICATION GUIDELINES**

The following guidelines apply to the land application of animal manure and other organic by-products and are consistent with the specifications contained in the conservation practice standards Nutrient Management (590) and Waste Utilization (633).

1. Land application of animal manure and other organic by-products shall be based on a field by field risk assessment for phosphorus transport from the field using the Phosphorus Index.
2. Animal manure or other organic by-products shall not be applied within 100 feet of a stream or waterbody or within 35 feet of a stream or waterbody where a well established vegetative buffer (natural or constructed) exists between the application site and stream or waterbody.
3. Animal manure or other organic by-products shall not be applied to actively eroding land areas except as specified in the conservation practice standard Critical Area Planting (342).
4. Animal manure and other organic by-products shall not be applied to soils with the following characteristics:
 - On soils with a water table within 2 feet of the surface
 - On soils which are frozen, snow covered or saturated
 - On soils with less than 10 inches to unconsolidated soil material
 - On soils subject to frequent flooding or overflow during times when flooding is expected. Frequently flooded sites may be used for land application between May 1 and November 15.
5. Application of animal manure and other organic by-products shall be delayed if precipitation capable of producing runoff and/or erosion is forecast within 24 hours of the time of the planned application.
6. Animal manure and other organic by-products shall not be applied in winter for spring seeded crops. Apply only to actively growing crops or forages.
7. Animal manure and other organic by-products shall not be applied within 100 feet of waterwells.
8. Animal manure and other organic by-products shall not be applied when wind direction and velocity would cause odors and/or particulate matter to drift toward residences, public areas or roads. The impact of odors can be minimized by applying wastes when temperatures are cool and when wind direction is away from neighbors.
9. Animal manure and other organic by-products associated with irrigation shall not be applied at rates in excess of the soil's infiltration rate.

EXHIBIT 2

Animal manure and other organic by-products shall be protected from the weather, accidental leakage or spillage. The material may be stored in temporary waste storage facilities (dry stack), pole barns or on the ground covered by 6 mil. polyurethane secured with weights (old tires, etc.) or in silage bags. If stored outside on the ground more than 30 days, the ground should first be covered with an impervious liner to prevent nitrogen leaching into ground water.

10. Manure spreaders or similar equipment shall be calibrated to ensure uniform application of material at planned rates.
11. Animal manure and other organic by-products shall be sampled at least once annually. Wastes shall be analyzed for moisture content, N, P and K as a minimum.
12. Soil samples shall not be more than three (3) years old. Annual soil testing, where animal manure and other organic by-products are land applied, is highly recommended.
13. Records shall be kept for a minimum of five (5) years which document implementation of plans for nutrient management and waste utilization. As applicable, records shall include:
 - Quantity of manure and other agricultural waste produced and their nutrient content
 - Soil test results (no more than 3 years old)
 - Dates and amounts of waste application where land applied and the dates and amounts of waste removed for energy production or export from the operation
 - Waste application method
 - Crops grown and yield (both yield goals and measured goals)
 - Other tests such as determining the nutrient content of the harvested product
 - Calibration of application equipment

EXHIBIT 3

**ESTIMATE OF LAND AREA NEEDED FOR
ANIMAL WASTE APPLICATION**

Name of Producer _____

Animal Type and Number Planned _____

Animal Units _____

Percent Confinement _____

Percent Separation _____

Type of Waste _____

Method of Application _____

Phosphorus Index Rating _____

Cropping System _____

1. Daily nutrient production per A.U. (1000 lbs) (Chapter 4, AWMFH)	N	P	K
_____	_____	_____	_____

2. Annual nutrient production per A.U. (1000 lbs) (Value from 1 X 365 days)	_____	_____	_____
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3. Total nutrient production (Value from 2 X No. A. Us X % confinement)	_____	_____	_____
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4. Nutrients available following Separation (As per NRCS Internal FAX)	_____	_____	_____
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5. Nutrients available following treatment/storage (Table 11-5, AWMFH)	_____	_____	_____
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6. Nitrogen available following application losses (Table 11-6, AWMFH)	_____	_____	_____
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7. Nitrogen available following leaching losses (Table 11-7, AWMFH)	_____	_____	_____
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EXHIBIT 4

PLANT NUTRIENT UPTAKE BY SPECIFIED CROP AND REMOVAL IN THE HARVESTED PART OF THE CROP FOR MACRO AND SECONDARY PLANT NUTRIENTS ¹								
CROP	DRY WT.	TYPICAL	AVERAGE AMOUNT OF NUTRIENTS					
	LB./BU.	YIELD/ACRE	N	P ²	K ³	Ca	Mg	S
		PLANT PART						
GRAIN CROPS								
CORN	56	120 bu.	108	19	27	1	7	8
		4.5 T. stover	100	18	120	26	20	14
OATS	32	80 bu.	50	9	13	2	3	5
		2 T. straw	25	6	66	8	8	9
RICE	45	5500 Lbs.	76	13	13	4	6	4
		2.5 T straw	30	5	58	9	5	NA
RYE	56	30 bu.	35	4	8	2	3	7
		1.5 T. straw	15	4	21	8	2	3
SORGHUM	56	60 bu.	56	12	14	4	6	6
		3 T. stover	65	9	79	29	18	8
WHEAT	60	40 bu.	50	15	12	1	6	3
		1.5 T. straw	20	2	29	6	3	5
OIL CROPS								
PEANUTS	22-30	2800 lbs.	101	5	14	1	3	7
		2.2 T. vines	103	11	77	44	17	16
RAPESEED (CANOLA)	50	35 bu.	63	14	13	A	12	NA
		3T. Straw	269	26	202	88	4	41
SOYBEANS	60	35 bu.	131	13	40	6	6	4
		2 T. stover	90	9	42	40	18	10
SOYBEANS	60	25 bu.	94	10	29	4	4	3
		1.1 T. stover	50	5	23	22	10	6
SUNFLOWERS	25	1100 lbs.	39	18	12	2	4	2
		4 T. stover	120	14	234	138	7	3
FIBER CROPS								
COTTON	1 bale	1333 SC	36	8	11	2	4	3
		1.1 T. stalks	39	5	32	31	9	17

EXHIBIT 4

CROP	DRY WT LB./BU	TYPICAL YIELD/ACRE PLANT PART	AVERAGE AMOUNT OF NUTRIENTS					
			N	P ²	K ³	Ca	Mg	S
COTTON	1.5 bales	2000 SC 1.7 T. stalks	53 60	12 7	17 49	3 48	5 14	4 25
COTTON	2 bales	2667 SC 2.25 T. stalks	71 79	15 10	22 65	3 63	7 18	5 34
FOREST ⁴								
PINE	5,200 lbs.	per cord	6	1	3			
	16,000 lbs.	per 1,000 mbf	19	3	10			
HARDWOOD	5,700 lbs	per cord	11	1	6			
	19,000 lbs	per 1000 mbf	38	4	19			
FORAGE CROPS								
BAHIAGRASS		3T	76	8	104	26	15	12
BERMUDAGRASS		4T	150	15	112	30	12	18
CLOVER/GRASS		6T	182	32	83	110	34	18
DALLISGRASS		3T	115	12	103	34	24	NA
BERMUDAGRASS (hybd)		8T	301	30	224	59	24	35
RED CLOVER		2.5T	100	11	83	69	17	7
RYEGRASS		5T	167	27	142	65	35	NA
TALL FESCUE		3.5T	138	14	140	21	13	NA
SWITCHGRASS		3T	6	6	114	17	15	NA
INDIANGRASS		3T	60	51	72	9	NA	NA
BIG BLUESTEM		3T	59	51	105	NA	12	NA
LITTLE BLUESTEM		3T	66	51	87	NA	12	NA
LESPEDEZA		3T	140	13	64	67	16	20
SILAGE CROPS								
CORN SILAGE (35% dm)		20T (wet)	154	35	153	50	25	21
SORGHUM SILAGE (30% DM)		20T (wet)	173	23	122	44	37	13
SORGHUM SUDAN SILAGE (50% DM)		10T (wet)	136	16	145	43	34	4

EXHIBIT 4

SUGAR CROPS								
SUGAR CANE		30T	96	24	222	30	24	24
CROP	DRY WT	TYPICAL	AVERAGE AMOUNT OF NUTRIENTS					
	LB./BU	YIELD/ACRE	N	P ²	K ³	Ca	Mg	S
		PLANT PART						
FRUIT CROPS								
PEACHES		15T	36	9	57	3	9	3
TOMATOES		22T	132	18	145	9	13	18
VEGETABLE CROPS								
BELL PEPPER		9T	72	22	88	NA	7	NA
CABBAGE		20T	132	16	108	20	8	44
CUCUMBERS		10T	40	14	66	NA	4	NA
ONIONS		18T	108	22	79	25	4	43
PEAS		1.5T	110	12	27	2	7	7
POTATOES		14.5T	96	23	151	3	9	9
SNAP BEANS		3T	53	16	58	3	6	7
SWEET CORN		5.5T	98	26	64	NA	8	7
SWEET POTATOES		7T	42	6	59	4	8	6
¹ For crops and/or yields not listed above, see the nutrient uptake calculations and Table 6-6, Chapter 6, AWMFHB.								
² To convert to P ₂ O ₅ multiply by 2.29								
³ To convert to K ₂ O multiply by 1.2								
⁴ Weights provided for pine and hardwood timber are Doyle Scale, legal log rule for Louisiana								