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Nutrient Management Planning Guidelines to comply with the Kentucky Agriculture Water Quality Act

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All farms with 10 acres or more that land apply animal manures, commercial fertilizers, or other soil amendments as sources of plant available nutrients are required to develop and implement nutrient management plans in compliance with the Kentucky Agriculture Water Quality Act (KAWQA). Although there is no specific format required for nutrient management plans developed for the sole purpose of complying with the KAWQA, certain "basic" information should be included in all plans. The guidelines for nutrient management plans discussed in this publication are more "basic" than guides for comprehensive nutrient management planning required for farms with concentrated animal feeding operations (CAFO), and those requiring state construction or operational permits. If federal or state cost share is not involved, these "basic" nutrient management plans developed by the farm owner/operator would not require the assistance of a "certified" nutrient management planner.

This publication is not a legal document and is solely intended as a guide for farm owners/operators to use in developing basic nutrient management plans to comply with requirements of the KAWQA.

What is needed in a "basic" plan:

- A general description of the farming operation and where nutrients will be applied.
- Animal manures produced as part of the farming operation. Include information pertaining to the kind and amount of manure that will be collected, manure storage information, and manure nutrient content based upon manure analysis (test) results or average manure nutrient content as applicable. *(Use attached Form 1)*
- Farm layout map or sketch indicating the fields that are planned for nutrient application. *(Use attached Form 2)*
- Annual farm cropping plan, soil test results, and fertilizer recommendations. *(Use attached Form 3)*
- Manure utilization plan by field. *(Use attached Form 4)*
- Annual record of nutrient applications by field and/or record of off-farm transfer of manure. *(Use attached Form 5)*

Other factors that need to be considered when using animal manures:

1. *Manure Storage*

- Store manure under roof until removal for use.
- Manures stored temporarily (30 days or less) outside must be covered to keep them dry.
- Divert surface water away from stored manure.
- Storage areas must not be within 150 feet of waterways, streams, sinkholes, or within 300 feet of water wells not owned by the producer.
- Buffer strips of grass sod or woody plants should be maintained downslope of manure storage areas.

2. *Nutrient Application to Fields*

- Apply nutrients at the right time for the crop based on soil test recommendations or crop nutrient removal values as applicable.
- Be considerate of neighbors when spreading manure:
    - Observe setback requirements (50 feet from property lines, 300 feet from dwellings).
    - Don't apply manure when wind is blowing toward neighbors.
    - Don't apply manure on weekends, or around holidays.
    - Inject, or incorporate manures when possible.
- Don't apply manure within 200 feet of water wells, or 75 feet of sinkholes, streams, ponds, etc.
- Don't apply manure or fertilizer to sod waterways, filter strips, or buffer strips.

3. *Transporting Manures*

- Prevent manure spillage on roadways.
- Cover manure so it does not blow out during transport.
- Try to avoid travelling through high population areas as much as possible.

If manure is to be used, all of the following forms will be needed.

If only commercial fertilizer and lime are to be used, Forms 2, 3, and 5 are needed along with the title page.

Kentucky Agriculture Water Quality Nutrient Management Plan

Description of Farming Operation

Farm

Owner/Operator

Operator (if not owner)

Address

Plan Developed By

Date

1. Are you farming ten acres or more of land and/or have poultry house(s) on less than ten acres?

   _____ No. Stop. You do not need to complete this workbook.

   _____ Yes. Go to the next question.

2. Will you be using animal manures, or other organic sources of nutrients on this farm?

   _____ No. Complete Forms 2, 3, and 5 only.

   _____ Yes. Go to next question.

3. Will you be using a liquid manure handling system, or is your operation large enough to be classed as a Concentrated Animal Feeding Operation (1000 beef cattle, 100,000 chickens, 700 dairy cows)?

   _____ Yes. Stop. You will not be able to use this workbook. Contact your local Natural Resources Conservation Service, Cooperative Extension Service, or private certified nutrient management planner for assistance in developing a Comprehensive Nutrient Management Plan.

   _____ No. Go to Form 1.

Form 1: Manure Production Information
(Leave blank if not collecting and/or applying manure)

	Animal Type/Size	Number		Confinement Period (months)		Manure (tons) per month*		Total Manure (tons)
Example	***Beef cow/ 1000 lb***	***50***	***X***	***3***	***X***	***0.18***	=	***27***
			X		***X***		=	
			X		***X***		=	
			X		***X***		=	
			X		***X***		=	
			X		***X***		=	

***See Appendix Table 1.**

	Poultry 1000 bird Type/Size	Capacity		Manure (tons) per 1000 birds per year*		Total Manure (tons)
Example	***Broiler/3.2 lb***	***52***	***X***	***7***	=	***364***
			X		=	
			X		=	
			X		=	
			X		=	
			X		=	

***See Appendix Table 1.**

Manure Nutrient Content**

	Type of manure (Dry lot, stack pad, broiler cake, etc.)	N	P_2O_5	K_2O
Example	***Dairy Stack Pad Manure***	***11***	***9***	***12***

****See Appendix Table 2.**

Manure Collection and Storage Information (as applicable)

Describe method of collection and storage such as dry lot, stack pad, poultry house cake, poultry house cleanout or other information.

Availability of Manure Nutrients:

The availability of nutrients in manure (especially nitrogen) is not equal to inorganic fertilizer. Since fertilizer recommendations are based on inorganic fertilizer, the nitrogen content of manure needs to be adjusted. The following formulas can be used to calculate crop available nitrogen (N) in manures:

A)	Cool season grass, pasture, hay fields (Spring or Fall applied)	Available N = Total N x 0.8
B)	All other crops (applied pre-plant) and Bermudagrass	Available N = Total N x 0.5

Example 1. Dairy manure from a stack pad is to be applied to fescue pasture. The total nitrogen (N) in dairy stack pad manure (Appendix Table 1) is 11 pounds per ton.

Available N = 11 x 0.8 (from above)
= 8.8 pounds per ton

Example 2. Fresh broiler litter is to be used for a corn crop. The total N in broiler litter (Appendix Table 1) is 55 pounds per ton.

Available N = 55 x 0.5
= 27.5 pounds per ton

Form 2: Farm Layout

Farm

Owner/Operator

Date

Farm Map:
Show field outlines and numbers, streams, sinkholes, wells, animal facilities, roads, and conservation practices. Attach map or sketch in box below.

Form 3: Annual Farm Cropping Plan

Farm

Owner/Operator

Date

Field	Acres	Year	Crop to be grown	Soil Test pH	P*	K	Crop nutrient needs** N***	P_2O_5	K_2O

** If soil test phosphorus (P) is 400 or above based on University of Kentucky lab procedures, contact your Natural Resources Conservation Service Office before applying manure to the field.*

*** Based on Soil Test Recommendation or Crop Nutrient Removal Values in Appendix Table 3.*

**** Nitrogen rates are to be based on University of Kentucky recommendations, or crop N removal rates given in Appendix Table 3.*

Form 3 Continued: Annual Farm Cropping Plan

Field	Acres	Year	Crop to be grown	Soil Test pH	P*	K	Crop nutrient needs** N***	P_2O_5	K_2O

Form 4: Manure Utilization Plan

Farm

Owner/Operator

Year

Manure to be used on farm:

Field	Acres	Crop	Manure application rate*	Date**	Total manure applied (acres x rate)

Total manure (tons) that will be land applied _____

Total manure (tons) for other on-farm uses _____

(Explain)

Manure (tons) to be transferred off-farm _____

Total Manure: _____

**** Maximum application rate per acre per year: = Rec. N. Rate / Available Manure N. Maximum amount of manure that can be applied in a single application is limited to10 tons per acre of solid manures. For tobacco, use no more than 10 tons of animal manure or 4 tons of poultry manure per acre to avoid excess chloride. Fertilizer phosphorus should not be applied on fields that receive manure.***

*****Manure will be applied no earlier than 30 days prior to active crop growth.***

Form 4: Manure Utilization Plan

Farm

Owner/Operator

Year

Manure to be used on farm:

Field	Acres	Crop	Manure application rate*	Date**	Total manure applied (acres x rate)

Total manure (tons) that will be land applied _____

Total manure (tons) for other on-farm uses _____

(Explain)

Manure (tons) to be transferred off-farm _____

Total Manure: _____

**** Maximum application rate per acre per year: = Rec. N. Rate / Available Manure N. Maximum amount of manure that can be applied in a single application is limited to10 tons per acre of solid manures. For tobacco, use no more than 10 tons of animal manure or 4 tons of poultry manure per acre to avoid excess chloride. Fertilizer phosphorus should not be applied on fields that receive manure.***

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Form 4: Manure Utilization Plan

Farm

Owner/Operator

Year

Manure to be used on farm:

Field	Acres	Crop	Manure application rate*	Date**	Total manure applied (acres x rate)

Total manure (tons) that will be land applied _____

Total manure (tons) for other on-farm uses _____

(Explain)

Manure (tons) to be transferred off-farm _____

Total Manure: _____

**** Maximum application rate per acre per year: = Rec. N. Rate / Available Manure N. Maximum amount of manure that can be applied in a single application is limited to10 tons per acre of solid manures. For tobacco, use no more than 10 tons of animal manure or 4 tons of poultry manure per acre to avoid excess chloride. Fertilizer phosphorus should not be applied on fields that receive manure.***

*****Manure will be applied no earlier than 30 days prior to active crop growth.***

Form 4: Manure Utilization Plan

Farm

Owner/Operator

Year

Manure to be used on farm:

Field	Acres	Crop	Manure application rate*	Date**	Total manure applied (acres x rate)

Total manure (tons) that will be land applied _____

Total manure (tons) for other on-farm uses _____

(Explain)

Manure (tons) to be transferred off-farm _____

Total Manure: _____

**** Maximum application rate per acre per year: = Rec. N. Rate / Available Manure N. Maximum amount of manure that can be applied in a single application is limited to10 tons per acre of solid manures. For tobacco, use no more than 10 tons of animal manure or 4 tons of poultry manure per acre to avoid excess chloride. Fertilizer phosphorus should not be applied on fields that receive manure.***

*****Manure will be applied no earlier than 30 days prior to active crop growth.***

Form 5: Annual Record of Nutrient Applications from all sources for _____(Year)

Field	Acres	Type of Nutrient	Date Applied	Amount Applied	Notes*

*Indicate weather conditions or other important information.

Total Land Applied Manure _____

Other On-farm Use _____

(Explain)

Manure Moved Off-farm:

Name of Recipient	Date	Amount

Form 5: Annual Record of Nutrient Applications from all sources for _____(Year)

Field	Acres	Type of Nutrient	Date Applied	Amount Applied	Notes*

*Indicate weather conditions or other important information.

Total Land Applied Manure _____

Other On-farm Use _____

(Explain)

Manure Moved Off-farm:

Name of Recipient	Date	Amount

Form 5: Annual Record of Nutrient Applications from all sources for _____(Year)

Field	Acres	Type of Nutrient	Date Applied	Amount Applied	Notes*

*Indicate weather conditions or other important information.

Total Land Applied Manure _____

Other On-farm Use _____

(Explain)

Manure Moved Off-farm:

Name of Recipient	Date	Amount

Form 5: Annual Record of Nutrient Applications from all sources for _____(Year)

Field	Acres	Type of Nutrient	Date Applied	Amount Applied	Notes*

*Indicate weather conditions or other important information.

Total Land Applied Manure _____

Other On-farm Use _____

(Explain)

Manure Moved Off-farm:

Name of Recipient	Date	Amount

Appendix Table 1
Manure Production Values for Farm Animals and Poultry in Kentucky*

Animal Type	Average wt. (lbs)	Manure/Animal/Month (Tons)	(Cubic Feet)	Moisture %
Beef Feeders	500	0.04	1.28	52
High Energy Diet	700	0.05	1.60	
	900	0.07	2.24	
	1100	0.08	2.56	
Beef Cows/Heifers	800	0.14	7.5	53
	1000	0.18	9.6	
	1200	0.21	11.2	
	1400	0.24	12.8	
Dairy Cows/Heifers	500	0.13	7.6	60
High Forage Diet	700	0.18	10.5	
	900	0.23	13.4	
	1100	0.28	16.3	
	1300	0.33	19.2	
Horses	800	0.18	10.5	50
High Forage Diet	1000	0.23	13.4	
	1200	0.27	15.7	
	1400	0.32	18.6	
	1600	0.37	20.5	
Goats	140	0.087	3.35	52
Sheep	60	0.036	1.4	52
Rabbits	10	0.0047	0.332	50
Poultry Type	**Average Wt. (lbs)**	**Manure/1000 Bird Capacity/Year (Tons)**	**(Cubic yards)**	**Moisture %**
Broiler	2.1	7	17	20
	3.2	7	17	
Pullet	2	8	20	20
	4	8	20	
Layer	4	25	53	30
	8	25	46	40

*Based on information found in NRCS Nutrient Management Code 590; Livestock and Poultry Environmental Stewardship Curriculum. Midwest Plan Service. Iowa State University, N.C. State University web pages, and other sources.

Appendix Table 2
Nutrient Content of Solid Manures Commonly Used in Kentucky*

Manure Type	N lbs/t	P_2O_5 lbs/t	K_2O lbs/t	Moisture %
Beef	11	7	10	52
Dairy	11	9	12	60
Horse	12	10	12	50
Broiler				
Fresh	55	55	45	20
Stockpiled	40	80	35	20
Cake	60	70	40	30
Pullet	40	68	40	25
Breeder	35	55	30	40
Layer	30	40	30	40
Goat	22	12	24	52
Sheep	21	9.4	19	52
Rabbit	24	25	11	50

*All values on an “as-is” moisture basis.

Appendix Table 3
Nutrient Removal Values for Selected Crops*

Crop	Yield Unit	Lbs per yield unit	Nutrients Removed (lbs per yield unit) N	P_2O_5	K_2O
Alfalfa hay	Ton	2000	50	14	55
All other grass/legume hay	Ton	2000	35	12	53
Grass/legume pasture	Ton	2000	11	4	16
Barley for grain	Bushel	48	0.9	0.41	0.3
Corn for grain	Bushel	56	0.7	0.4	0.35
Corn for silage or green chop	Ton	2000	7.5	3.6	8
Sorghum for grain	Bushel	56	0.95	0.41	0.3
Soybean for beans	Bushel	60	3	0.7	1.1
Tobacco, burley	Pound	1	0.07	0.011	0.075
Tobacco, dark air-cured	Pound	1	0.07	0.006	0.06
Tobacco, dark fire-cured	Pound	1	0.07	0.006	0.06
Winter wheat for grain	Bushel	60	1.2	0.5	0.3
Rye for grain	Bushel	56	1.16	0.33	0.32
Oats for grain	Bushel	32	0.62	0.25	0.19
Warm season native grass hay	Ton	2000	20	6.8	25
Bermudagrass hay	Ton	2000	38	9	34
Bermudagrass pasture	Ton	2000	12	3	11
Reed canary grass hay	Ton	2000	27	8	25
Eastern gamagrass hay	Ton	2000	35	16	31

*Adapted from “Poultry Nutrient Management Plan” Table 6. Crop Nutrient Removal Values. Kentucky NRCS, December 2001.