

Nutrient Management Planning for WV Animal Feeding Operations

AFO & Small CAFO Professional
Development Training
Feb, March 2013

Tom Basden

Ag. and Natural Resources

WVU Extension Service, Morgantown WV

The background of the slide features several concentric, light blue circular ripples that resemble water droplets hitting a surface, scattered across the lower half of the page.

Introduction

- Why is Nutrient Management So Important?
 - Changes in Farming Systems and Nutrient Cycling
 - Components of Nutrient Management Plan
 - Example Planning Document
- 

Current Nutrient Management Planning Process

- Plan ID Producer name, Planner name, Narrative
- Map, Aerial Photograph, farm location, tract boundaries, unique features, sinkholes, watercourses, etc.
- Summary of Nutrient Recommendations, planned crop, realistic yield goal, field specific, using soil test results and manure analysis.
- Plan Maintenance, updated every 3 years unless a change in operation occurs. Crop rotation, change in manure production or analysis. Plan updated at time of change

Nutrient Cycling

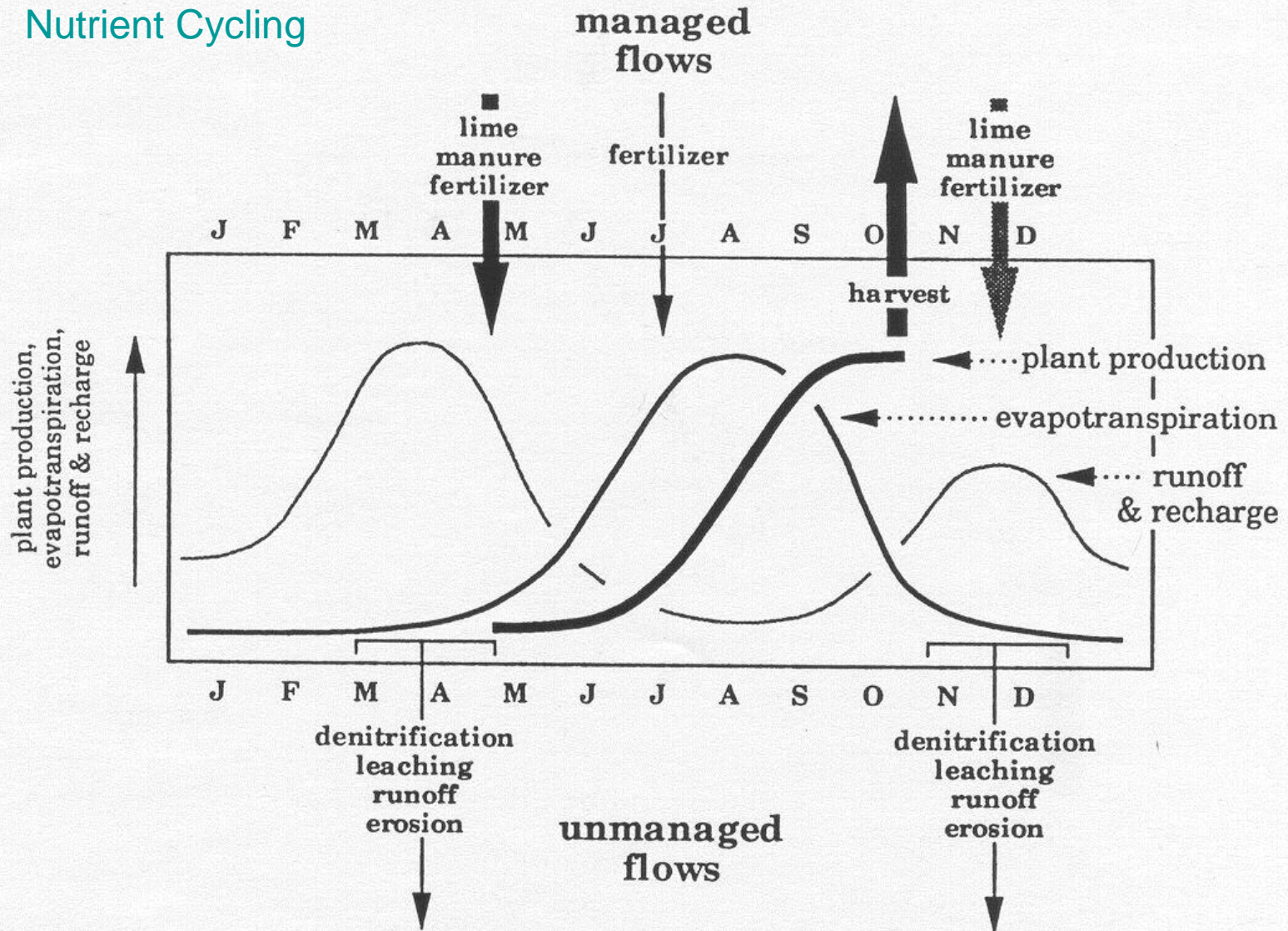



Figure 4 Seasonal aspects of nutrient flows into and out of fields for a northern hemisphere temperate region annual crop.


Components of a CAFO Nutrient Management Plan

- 1. Implementation
 - 2. Recordkeeping
 - 3. Transfer of Manure, Litter and PWW
 - 4. Annual Reporting
 - 5. Terms of the NMP
 - 6. Changes to a NMP
- 

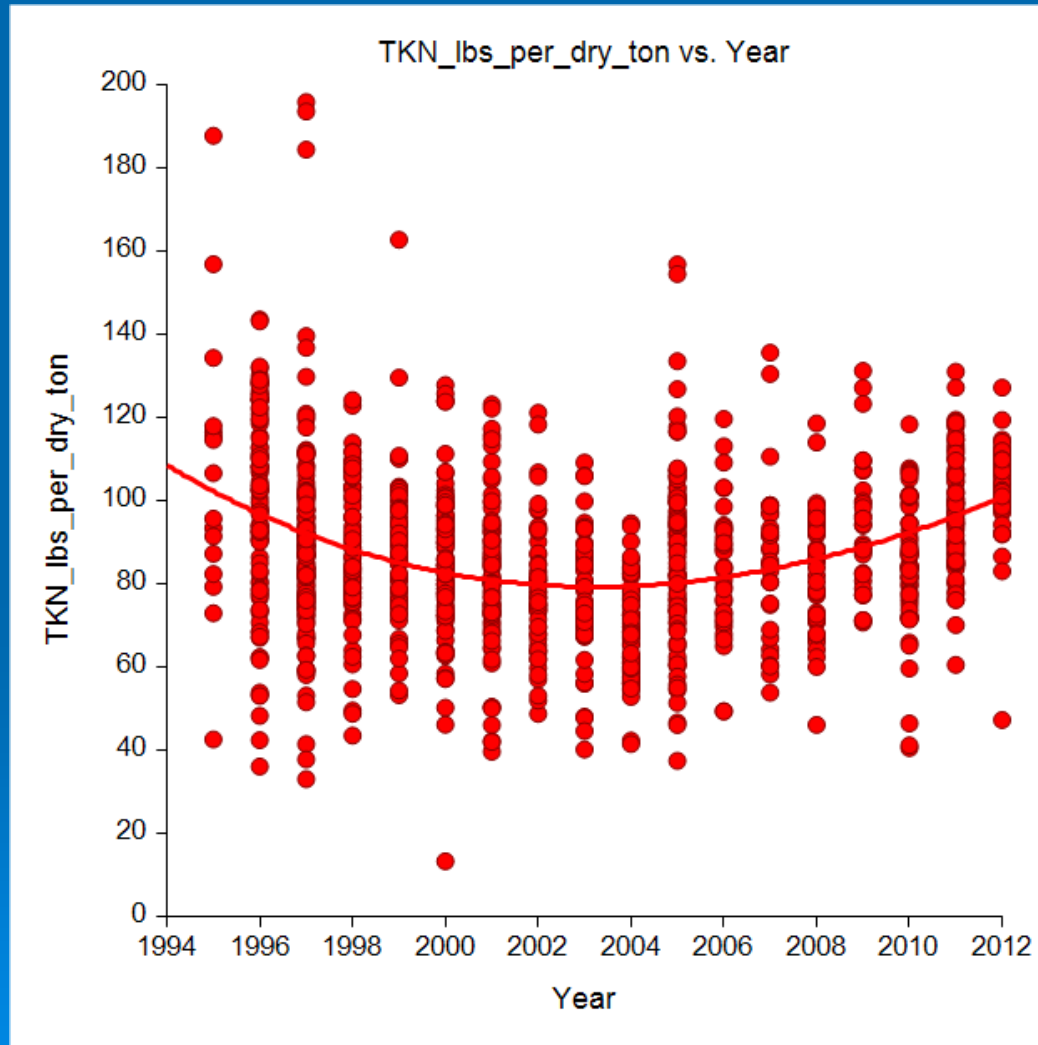
Requirement to implement a NMP

- (i) Manure and Wastewater Handling, Maintenance and Storage
- (ii) Management of Mortalities
- (iii) Production area that keeps clean water from entering. An engineering component
- (iv) Prevention of direct contact of confined animals with waters of the US. No feeding areas with access to streams

Requirements to implement a NMP

- (v) no contaminants added to manure, litter or waste water
 - (vi) Site specific buffers to control runoff or other conservation practices
 - (vii) Testing of Manure, litter, waste water and soil.
- 

Broiler Litter, TKN




Requirements to implement a NMP

- (viii) protocols to land apply manure, litter and processed waste water, site specific field at agronomic rates.
- (ix) Identify specific records that will be maintained to document the implementation and management of these mentioned components

Recordkeeping Requirements

- (i) Must be created and maintained for a five year period
- (ii) A copy of the site specific NMP must be maintained on site

Terms of the NMP

1. Field specific assessment for potential losses of N & P
 2. Planted crops or pasture
 3. Realistic yield goals
 4. N & P recommendations for each crop and field
 5. Credits for all plant available nitrogen
- 

Terms of the NMP

6. consideration of multi-year phosphorus application

7. Form and source of manure, litter or PWW

8. Timing and method of application

9. Methodology for manure analysis

Large CAFOs must calculate N & P loading rates each year from manure test

NUTRIENT MANAGEMENT PLAN IDENTIFICATION

Operator

Dixon Orndorff
PO Box 42
Wardensville, WV 26851
(304)874-3848

Integrator: Cargill

Watershed Summary

watershed: Cacapon River
county: Grant & Hardy (WV628)

Nutrient Management Planner

Jason Dalrymple
WVDA
60B Moorefield Industrial Park Rd.
Moorefield, WV 26836

Certification Code: 103

Acreage Use Summary

Total Acreage in this plan: 137.

Cropland: 0.
Hayland: 137.
Pasture: 0.
Specialty: 0.

Livestock Summary

Beef Cattle 0
Dairy Cattle 0
Poultry 72000
Swine 0
Other 0

Manure Production Balance

	Imported	Produced	Exported	Used	Net
kgals	0.	0.	0.	0.	0.
tons	0.	2080.	1915	165	0.

Plan written 7/17/2012
Valid until 7/17/2015

Signature: _____

Jason N. Dalrymple #103

Date: _____

7/18/12

RECEIVED JUL 30 2012

Capon Valley Farm Narrative

Capon Valley farm is a Turkey operation located in Wardensville, WV. Dixon Orndorff owns and operates the farm. To get to his farm from Moorefield you take Corr-H to Wardensville, make a right on to North Mt. Road to go 2 1/2 miles, make a right on to Fox Run Rd. His operation consists of 2 start outs and 4 grow outs. He has 2 - 824'x50' and 2 - 612'x50' turkey houses. At one time on the farm there could be up to 72,000 birds in the houses. Litter is reused from the starter ends to put in to the grow out ends. So litter production is coming from 52,000 birds. The farm produces roughly around 2080 tons of litter annually. The farm operates on a build-up litter system. The houses are only crusted out, which produces less litter. Every other year or more there is a full clean out done on the houses. An accurate litter production record shall be kept on the farm to show how much litter is produced annually from crust outs and full clean outs. Litter is stored in a 40'x120' litter shed that was designed to hold a 348 tons. Turkey mortality is composted in a seven bin composting structure or it is brought to Valley Protein. In case of mass mortality then protocols from the WV AI Task Force shall be implemented.

2010 P-Index was ran on each field with a High or Very High soil P level. P-Index levels shown either a low or medium risk, which allows for N-Based planning.

If fertilizer is used instead of litter then use the recommendation of nutrients needed from the balance page.

Liming recommendations on the soil test page are recommended for grass hay and pastures with less than 30% legumes. If he wants to increase legume percentage and maintain it above 30% then the liming recommendation from the soil test results can be used. Liming can occur any time during the growing seasons of this plan.

The production area was designed to divert storm-water away from the buildings. It shall be maintained in a way to divert water to grass buffer and forest buffer areas. Buffer areas shall be vegetated all year. Weekly inspection of the Diversion ditches shall be done to make sure ditches are clear from debris.

Crop yield nutrient values was taken from Tables 1-1 & 1-2 of the, "Technical Standards of WV CAFO Nutrient Management Planning".

All agri-chemicals used on the farm is stored, applied and disposed of by means of the directions on the label.

A 35ft. vegetated buffer shall be kept in application areas along streams, wetlands and other water bodies. Areas have been designated on the site map.

Manure Production Summary

Manure Name: Poultry

Animal Summary

Turkey Hen: 52000

Manure Storage Capacity: 348. tons

Manure Analysis:

TKN: 61.49

P2O5: 38.73

NH4: 24.38

K2O: 40.08

Plant Available Nutrients:

Immediate Incorporation:

44.21 lbs N

38.73 lbs P2O5

40.08 lbs K2O

Surface Applied:

34.46 lbs N

38.73 lbs P2O5

40.08 lbs K2O

Residual N:

yr 1: 4.45 lbs

yr 2: 1.86 lbs

yr 3: .74 lbs

Manure Production

Dec-Feb 520

Mar-May 520

Jun-Aug 520

Sep-Nov 520

Total Produced: 2080

Manure Sold/yr: 1874

Manure purch./yr: 0

Poultry Manure Production Calculation Details

$$\text{production[tons/yr]} = (\# \text{ confined})[\text{birds}] * (\# \text{ cycles})[\text{cycles}] * (\text{prod factor})[\text{tons/cycle/K-bird}] * (0.001)[\text{K-bird/bird}]$$

Group Name	animal	%(#) confined	avg wt	prod factor	produced
Turkey	Turkey Hen	100(52000)	23.00	8.	2080.



State of West Virginia
DEPARTMENT OF AGRICULTURE
Gus R. Douglass, Commissioner

Janet L. Fisher
 Deputy Commissioner

Bob Tabb
 Deputy Commissioner

Steve Miller
 Assistant Commissioner

LABORATORY ANALYSIS REPORT

WVDA Nutrient Management Lab
 Moorefield Field Office
 60B Industrial Park Road
 Moorefield, WV 26836
 304-538-2397

Date Received: May 31, 2012
 Date Sampled: May 31, 2012
 Date of Report: June 13, 2012

Submitted by: Dixon Orndorff
 P.O. Box 42
 Wardensville, WV 26851

Producer: Dixon Orndorff
 P.O. Box 42
 Wardensville, WV 26851

Sample ID Number: 05311201
 Sample Description: turkey litter from house

Test Parameter	lbs/ton	%	Test date	Method	MDL
(N)Nitrogen (TKN)	61.49	3.07	6/12/2012	SM 4500-NH ₃ C.	0.237
(P)Phosphate (P ₂ O ₅)	38.73	1.94	6/12/2012	SM 4500-P E.	0.035
(K)Potash (K ₂ O)	40.08	2.00	6/13/2012	SW846 7000B.	0.006
*Moisture	-----	22.54	6/11/2012	SM 2540 B.	0.124
Ammonium	24.38	1.22	6/12/2012	SM 4500-NH ₃ C.	0.009
**C:N Ratio	20.90	-----	6/12/2012	-----	-----
Copper	0.566	0.0283	6/13/2012	SW846 7000B.	0.002
Calcium	20.88	1.04	6/13/2012	SW846 7000B.	0.006
Magnesium	5.68	0.28	6/13/2012	SW846 7000B.	0.002
pH		8.12	6/12/2012	SW-846 9045D	

*Calculations based on Total Solids measurement

**Not a certified method

When surface applied this sample will supply plant available:

Nitrogen (N) (Surface available)	30.74	lbs/ton
Nitrogen (N) (Incorporated)	40.49	lbs/ton
Phosphate (P ₂ O ₅)	38.73	lbs/ton
Potash (K ₂ O)	40.08	lbs/ton

Nutrient Management Plan Balance Sheet
(Fall, 2012-Winter, 2015)
Capon Valley
Planner: Jason Dalrymple

Tract: 777 Location: Grant & Hardy (WV628)
(N = N based, 1P = P based, 1.5P = P based at 1.5 removal, 0P = P removal ignored)

Field CFSA No. /Name	Size (ac) Total/Used	Yr.	Crop	Needs N-P-K (lbs/ac)	Leg /Man Resid	Manure/Biosld Rate & Type (season)	IT (d)	Man/Bios N-P-K (lbs/ac)	Net = Needs - appld N-P-K (lbs/ac)	Sum P rem cred	Commercial N-P-K (lbs/ac)	Notes
1/1(N)	10/10	2012	Orchardgrass hay mt.	100-0-120	0/0	2.t Poultr(Fa)	>7	69-77-80	30-(75)-40	N/A		1
		2013	.....	100-0-120	0/20	2.t Poultr(Sp)	>7	69-77-80	10-(150)-80	N/A		
		2014	.....	100-0-120	0/16	2.t Poultr(Sp)	>7	69-77-80	15-(225)-120	N/A		
		2015	.....	100-0-120	0/14	2.t Poultr(Sp)	>7	69-77-80	15-(300)-160	N/A		
2/2(N)	15/13	2012	Orchardgrass hay mt.	100-0-60	0/0	2.t Poultr(Fa)	>7	69-77-80	30-(75)-(20)	N/A		1
		2013	.....	100-0-60	0/20	2.t Poultr(Sp)	>7	69-77-80	10-(150)-(40)	N/A		
		2014	.....	100-0-60	0/16	2.t Poultr(Sp)	>7	69-77-80	15-(225)-(60)	N/A		
		2015	.....	100-0-60	0/14	2.t Poultr(Sp)	>7	69-77-80	15-(300)-(80)	N/A		
3/3(N)	64/30	2012	Orchardgrass hay mt.	100-0-0	0/0	2.t Poultr(Fa)	>7	69-77-80	30-(75)-(80)	N/A		1
		2013	.....	100-0-0	0/20	2.t Poultr(Sp)	>7	69-77-80	10-(150)-(160)	N/A		
		2014	.....	100-0-0	0/16	2.t Poultr(Sp)	>7	69-77-80	15-(225)-(240)	N/A		
		2015	.....	100-0-0	0/14	2.t Poultr(Sp)	>7	69-77-80	15-(300)-(320)	N/A		
4/4(N)	9/5	2012	Orchardgrass hay mt. *	100-0-60	0/0	2.t Poultr(Fa)	>7	69-77-80	30-(75)-(20)	N/A		1,2
		2013	Orchardgrass hay mt.	100-0-60	0/20	2.t Poultr(Sp)	>7	69-77-80	10-(150)-(40)	N/A		2
		2014	.....	100-0-60	0/16	2.t Poultr(Sp)	>7	69-77-80	15-(225)-(60)	N/A		2
		2015	.....	100-0-60	0/14	2.t Poultr(Sp)	>7	69-77-80	15-(300)-(80)	N/A		2
5/5(N)	19/5	2012	Orchardgrass hay mt.	100-0-0	0/0	2.t Poultr(Fa)	>7	69-77-80	30-(75)-(80)	N/A		1
		2013	.....	100-0-0	0/20	2.t Poultr(Sp)	>7	69-77-80	10-(150)-(160)	N/A		
		2014	.....	100-0-0	0/16	2.t Poultr(Sp)	>7	69-77-80	15-(225)-(240)	N/A		
		2015	.....	100-0-0	0/14	2.t Poultr(Sp)	>7	69-77-80	15-(300)-(320)	N/A		

* For established hay, pastures, or no-till cropping systems where incorporation of lime is not possible, single applications should be limited to no more than 2 tons/acre. If incorporation is not feasible, apply one-half the total amount one year and the other half the next year.

Commercial Application Methods:

br - Broadcast ba - Banded sd - Sidedress

Notes:

- 1 If litter application has already been done for 2012 then do not apply any more litter.
- 2 If the field is being maintained as a pasture field then only apply at a 1 ton of litter/acre rate.

Farm Summary Report

Plan: New Plan Fall, 2012 - Winter, 2015

Farm Name: Capon Valley

Location: Grant & Hardy (WV628)

Specialist: Jason Dalrymple

Tract Name: 777

FSA Number: 777

Location: Grant & Hardy (WV628)

Land Owner: none specified

Field Name: 1

Total Acres: 9.96 Usable Acres: 9.96

FSA Number: 1

Tract: 777

Location: Grant & Hardy (WV628)

Slope Class: D Hydrologic Group: A Leaching Index: 0.00

Soil Test Results:

DATE	PH	P	K	MOST RECENT LIME
Sp-2012	6.2	VH	M-	

Soils:

PERCENT	SYMBOL	SOIL SERIES
50	BrD	BERKS WEIKERT

Field Warnings:

Environmentally Sensitive Soils due to:

Soils with parent slope in excess of 15%

Crop Rotation:

YEAR	SEASON	YIELD	UNITS	CROP NAME
2012	Fall	2.5	tons	Orchard grass (hay), maint.
2013	Spring	2.5	tons	Orchard grass (hay), maint.
2014	Spring	2.5	tons	Orchard grass (hay), maint.
2015	Spring	2.5	tons	Orchard grass (hay), maint.

Field Name: 2

Total Acres: 15.10 Usable Acres: 13.00

FSA Number: 2

Tract: 777


Location: Grant & Hardy (WV628)







Slope Class: D Hydrologic Group: A Leaching Index: 0.00

Soil Test Results:

DATE	PH	P	K	MOST RECENT LIME
------	----	---	---	------------------




 United States Department of Agriculture
 Farm Service Agency

-  Poultry Barn
-  Litter Shed
-  Composter
-  35ft. Buffer no application area
-  Well Heads
-  Production Area



Digital Orthophotography
Not to Scale



Year: _____

Manure Spreader Calibration Record - Swath (Load-Area) Method

Spreader Identification: _____

Date: _____

1. Determine the capacity of the spreader (use gallons for liquid and tons for solid manure).

a. Spreader capacity: gallons or tons

2. Spread one full load in a rectangular pattern.

Forward speed, gear or throttle setting:

PTO speed or setting:

Spreader gate opening setting:

3. Measure the Coverage area.

a. Spread area width:

b. Spread area length:

Trial 1	Trail 2	Trial 3

4. Calculate the area covered.

a. Spread area (3ax3b):

b. Spread area (4a / 43,560):

	sq.ft.
	acres

	sq.ft.
	acres

	sq.ft.
	acres

5. Calculate the manure application rates.

a. Application rate (1a / 4b):

	gallons or tons/acre
--	----------------------

6. Average each of the calibration trials to determine the final application rate.

Final calibrated application rate (average of trials in 5a):

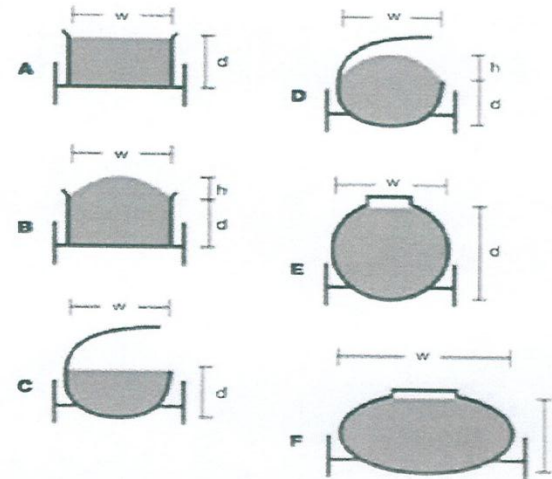
	gallons or tons/acre
--	----------------------

Determining Manure Spreader Capacity

Table 1. Commonly required conversions for manure spreader volumes.

To convert from	To	Multiply by
bushels	cubic feet	1.24
gallons	cubic feet	0.134
gallons	pounds	8.3 (liquid)
gallons	tons	0.0041 (liquid)
cubic feet	gallons	7.48
cubic feet	tons	0.031 (liquid) or 0.0275 (solid)
cubic feet	pounds	62 (liquid) or 55 (solid)

Figure 1. Manure Spreader Volumes



Solid or Semisolid		Volume										
[A] Box spreader (level load):			length x		width x		depth =		cu.ft.			
[B] Box spreader (piled load):			length x		width x		[depth + (stacking height x 0.8)] =		cu.ft.			
[C] Round-bottom open-top spreader(level load):			length x		depth x		(depth x 1.6) =		cu.ft.			
[D] Round-bottom open-top spreader (piled load):			length x		(depth x 1.6) x		(depth + stacking height) =		cu.ft.			
Liquid		Volume										
[A] Box spreader (level load):			length x		width x		depth =		cu.ft.			
[C] Round-bottom open-top spreader(level load):			length x		depth x		(depth x 1.6) =		cu.ft.			
[E] Tank spreader (round):			length x		tank diameter x		(tank diameter x 0.8) =		cu.ft.			
[F] Tank spreader (noncircular):			length x		width x		(depth x 0.8) =		cu.ft.			
Conversions												
			cu.ft. x	7.48 =		gallons	or		cu.ft. x	0.031 (liquid) or 0.0275 (solid) =		tons

Manure Spreading Summary

Season	Manure	Rate/ac	Tract	Field	Acres	Crop	Total in Field	Running Total
2012Fa		2.0 tons	777	1	10	Orchard grass (hay), main	20 tons	20 tons
		2.0 tons	777	2	13	Orchard grass (hay), main	26 tons	46 tons
		2.0 tons	777	3	30	Orchard grass (hay), main	60 tons	106 tons
		2.0 tons	777	4	5	Orchard grass (hay), main	10 tons	116 tons
		2.0 tons	777	5	5	Orchard grass (hay), main	10 tons	126 tons
		2.0 tons	Dudley	1	3	Orchard grass (hay), main	6 tons	131 tons
		2.0 tons	Sine	1	17	Orchard grass (hay), main	34 tons	165 tons

Season	Manure	Rate/ac	Tract	Field	Acres	Crop	Total in Field	Running Total
2013Sp		2.0 tons	777	1	10	Orchard grass (hay), main	20 tons	20 tons
		2.0 tons	777	2	13	Orchard grass (hay), main	26 tons	46 tons
		2.0 tons	777	3	30	Orchard grass (hay), main	60 tons	106 tons
		2.0 tons	777	4	5	Orchard grass (hay), main	10 tons	116 tons
		2.0 tons	777	5	5	Orchard grass (hay), main	10 tons	126 tons
		2.0 tons	Dudley	1	3	Orchard grass (hay), main	6 tons	131 tons
		2.0 tons	Sine	1	17	Orchard grass (hay), main	34 tons	165 tons

Season	Manure	Rate/ac	Tract	Field	Acres	Crop	Total in Field	Running Total
2014Sp		2.0 tons	777	1	10	Orchard grass (hay), main	20 tons	20 tons
		2.0 tons	777	2	13	Orchard grass (hay), main	26 tons	46 tons
		2.0 tons	777	3	30	Orchard grass (hay), main	60 tons	106 tons
		2.0 tons	777	4	5	Orchard grass (hay), main	10 tons	116 tons
		2.0 tons	777	5	5	Orchard grass (hay), main	10 tons	126 tons
		2.0 tons	Dudley	1	3	Orchard grass (hay), main	6 tons	131 tons
		2.0 tons	Sine	1	17	Orchard grass (hay), main	34 tons	165 tons

Season	Manure	Rate/ac	Tract	Field	Acres	Crop	Total in Field	Running Total
2015Sp		2.0 tons	777	1	10	Orchard grass (hay), main	20 tons	20 tons
		2.0 tons	777	2	13	Orchard grass (hay), main	26 tons	46 tons
		2.0 tons	777	3	30	Orchard grass (hay), main	60 tons	106 tons
		2.0 tons	777	4	5	Orchard grass (hay), main	10 tons	116 tons
		2.0 tons	777	5	5	Orchard grass (hay), main	10 tons	126 tons
		2.0 tons	Dudley	1	3	Orchard grass (hay), main	6 tons	131 tons
		2.0 tons	Sine	1	17	Orchard grass (hay), main	34 tons	165 tons

WEST VIRGINIA UNIVERSITY SOIL TESTING LABORATORY
P.O. Box 6108, MORGANTOWN, WV 26506-6108



DIXON ORNDORFF
PO BOX 42
WARDENSVILLE, WV-26851

County: HARDY
Email : jdalrymple@wvda.us
Phone: 3048743848

SAMPLE DETAILS

Sample ID: T777 F3

Sample Date	6/11/2012	Previous Crop	HAY
LAB ID	12-6050	Soil Name	BERKS-WEIKERT
Limed in last 12Months	No	Soil Texture	Silty Loam
Area (Acre)	61	Tillage Method	No-Till

LAB TEST RESULTS

Nutrients	Values	Rating		LOW	MEDIUM	HIGH	V HIGH
Soil pH	5.9	L.R.: 1.9					
P2O5(Lbs/A)	1661 <i>722</i>	VERY HIGH	P2O5	[Redacted]			
K2O(Lbs/A)	393 <i>327.5</i>	VERY HIGH	K2O	[Redacted]			
Ca(Lbs/A)	5624	VERY HIGH	Ca	[Redacted]			
Mg(Lbs/A)	437	HIGH	Mg	[Redacted]			

Nutrients	K	Ca	Mg	H	Total[CEC], BS(K+Ca+Mg)
MEQ/100	1	14	2	4	20
%Sat	3	70	10	19	83

RECOMMENDATIONS FOR CROP: TALL GRASS HAY OR PASTURE (Less than 30% legume)

Aglime	2 T/A GROUND LIME
Fertilizer - N (Lbs/Acre)	50 - 200
Fertilizer - P2O5 (Lbs/Acre)	0
Fertilizer - K2O (Lbs/Acre)	0

SUGGESTIONS

The above recommendations are for a yield goal of 3 to 4 Tons/Acre and assume a soil pH corrected to 6.5.

N needs depend on desired yield goal. K application should be reduced if magnesium (Mg) is low (less than 100 Lbs/A).

Use any fertilizer or approved organic material that will supply the plant nutrients recommended. Your county agent can suggest locally available fertilizers to suit the recommendation. Apply 50 Lbs/A of N by itself or with a complete fertilizer in late winter and/or September. An additional 50 Lbs/A of N can be applied after the first cutting if desired. Retest your soil each fall.

Jul-12 590 P INDEX

Field ID **T777 F#3** Total **17** Index Rating **Medium**

1 P Index rating value from soil test value

Soil Test P **722** lbs P/acre Box A= **8**

2 P Index rating value from manure/fertilizer type (Based on Phosphorus source coefficients)

Box B= **6**

If applying all other biosolids=	2
If applying Alum treated manures=	4
If applying BPR & BNR biosolids=	6
If applying beef, dairy, or poultry manure=	6
If applying swine manure=	8
If applying inorganic P fertilizer=	8

3 P Index rating value from manures/ fertilizer application method

Box C= **2**

If incorporating/ injecting manure/ fertilizer immediately before crop utilization=
 If surface applying manure/ fertilizer less than 3 months before crop utilization
 or at time of utilization=
 If incorporating manure/fertilizer more than 3 months before crop utilization=
 if surface applying manure/fertilizer more than 3 months before crop utilization=

4 P Index rating value from soil erosion (RUSLE2 values)

Box D= **0**

If soil loss from this field is T or less=	0
If soil loss from this field is > T but < 2T=	5
If soil loss from this field is 2T to <3T=	10

5 P Index rating value from sediment delivery (RUSLE2 values)

Box E= **1**

Sediment delivery= **0.09**

6 P Index rating value from soil drainage class

Box F= **0**

Well drained=	0
Moderately Well Drained=	4
Somewhat Poorly Drained=	8
Poorly Drained=	8
Very Poorly Drained=	8
Excessively Drained=	4

Questions ?

