

Manure Inventory

Introduction:

Manure management should be a top priority on any dairy and livestock farm. Mismanagement of manure can have a substantially negative impact on our air, water, and soil. When used appropriately, manure has significant agronomic and economic value. When used correctly, manure improves soil biological activity, tilth, and chemical properties. The purpose of a manure inventory is to estimate the amount of manure produced on a farm and therefore, to calculate the amount of nutrients excrete by livestock and poultry. A manure inventory also will assist a farmer in determining if sufficient land is available for agronomic utilization of manure nutrients.

Currently, manure production or nutrient excretion by various animals are based on body weight of the animal and often does not account for large variations in feeding types and amounts. Also, nutrient content of manure varies widely between farms due to differences in animal species, age, feed ration, bedding characteristics, storage structures, and manure handling.

Calculations:

Each ton of manure produced by dairy cows contains approximately 10 lbs. of nitrogen (N), 4 lbs. of phosphorus (P₂O₅), and 8 lbs. of potassium (K₂O) (Table 1). The actual concentration of these nutrients in stored manure will be influenced by storage losses and dilution from water (rainfall and milk wash waste water) as well as bedding.

Table 1: Average daily manure production and nutrient content of manure. Values are based on animal unit (1000 lb) and do not include bedding*.

Animal Type	Daily Production	Analysis Units	N	P ₂ O ₅	K ₂ O
Dairy Cow					
Lactating (liquid)	13 gal	lb/1000gal	28	13	25
Lactating (solid)	106 lb	lb/ton	10	4	8
Dry	82 lb	lb/ton	9	3	7
Calf and heifer	87 lb	lb/ton	7	2	7
Beef cattle					
Cow and calf	60 lb	lb/ton	11	7	10
Steer	75 lb	lb/ton	14	5	8
Veal	5 gal	lb/1000 gal	36	27	55
Swine					
Gestation	4 gal	lb/1000 gal	30	35	15
Lactation	10 gal	lb/1000 gal	25	20	15
Nursery	14 gal	lb/1000 gal	40	40	25
Grow-finish	11 gal	lb/1000 gal	50	55	25
Farrow to feeder	7 gal	lb/1000 gal	40	35	15
Sheep					
	40 lb	lb/ton	23	8	20
Horse					
	45 lb	lb/ton	12	5	9

*Adapted from: The agronomic guide 2002. College of Agricultural Sciences, Penn State University.

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Manure production on a farm can be estimated by using the following formula:

Manure production =
Number of Animals x Average Weight of Animal (lb) ÷
1000 (animal unit) x Daily Manure Prod. x Manure
Collection Period (days) + Estimated Percent of Bedding
in Manure.

Example: You have 10 lactating cows, each with an average weight of 1250 lbs. The animals are on pasture for 5.5 months (mid April through early October). You usually add about 5% bedding to the manure.

Total annual collectable manure =
10 (animals) x 1250 (avg. wt.) ÷ 1000 (animal unit) x 106
(daily manure prod. from Table 1)
= 1325 (lbs/day).
1325 x 195 (days kept in barn) = 258375 (lbs
manure/year).

Total waste production (bedding included) =
258375 x 0.05 = 12919 (lbs bedding added to the
manure).
258375 + 12919 = 271294 (lbs/year) or: 271294 ÷ 2000
= 136 (ton/year).
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**In the above example, nutrient inventory for the farm
can be calculated as:**
136 x 10 = 1360 lb N, 136 x 5 = 544 lb P₂O₅, and 136 x 8
= 1088 lb K₂O

Manure nutrient inventory for a farm is only practical if
used in conjunction with proper on-farm management
practices including manure storage and handling,
application method, correct timing for crop uptake, and
nutrient availability of applied manure.

For more information visit www.umass.edu/cdl

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